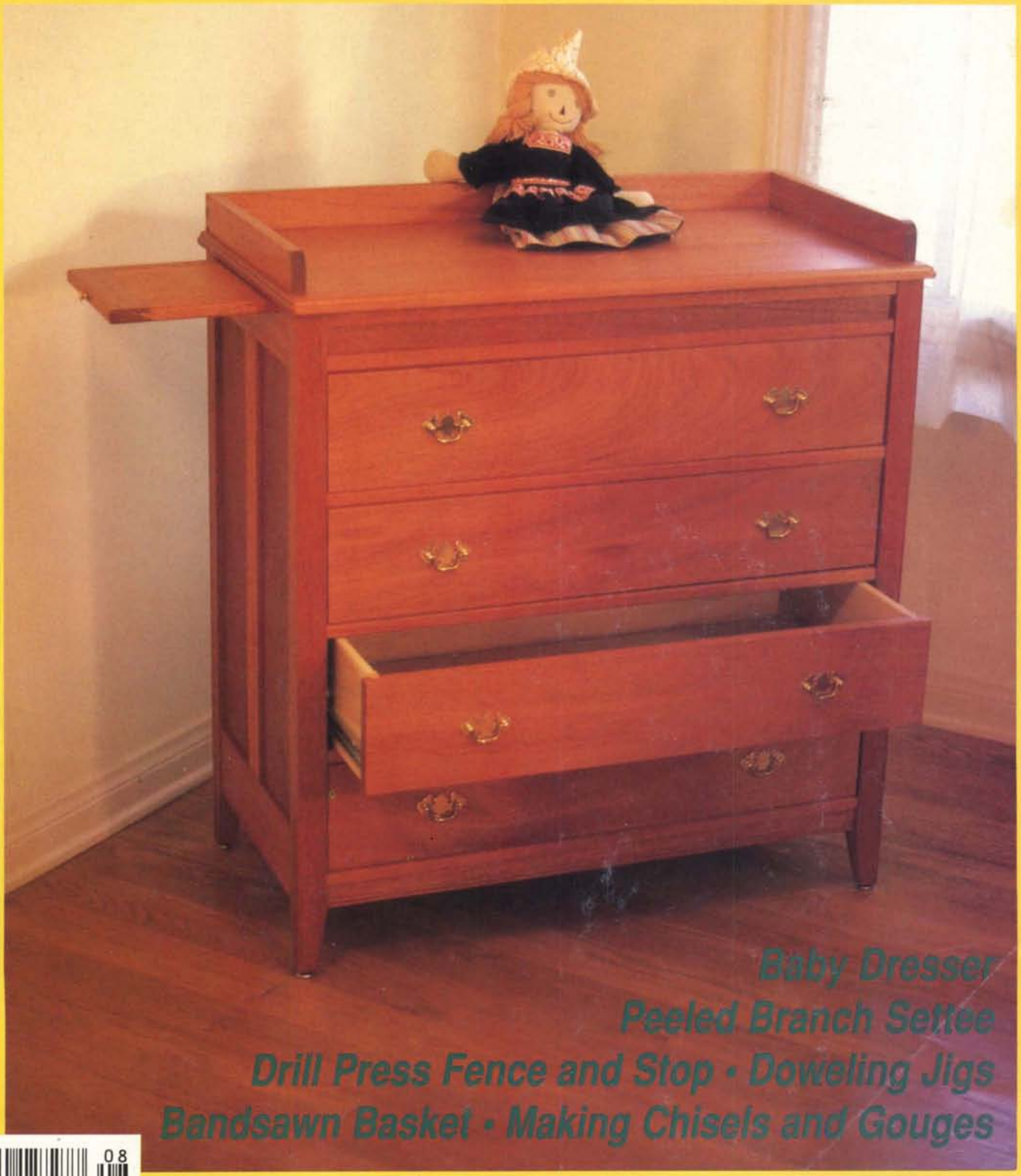
Popular Woodworking

Issue 44 August 1988 $2.95



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Popular Woodworking

Issue #44 August 1988 Volume 8, Number 2

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On the Cover

This handsome post and panel dresser for the nursery will serve a child for years and become a family heirloom for generations. S. Reed Poverny tells how to make it, starting on page 30. Since the frame is assembled with dowels, you'll want to make the drill press fence and stop on page 24 or choose from the doweling jigs reviewed on page 44.

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Clear Cuts

My projects lately have been rather different from the kinds of things we present on these pages. I've entered year two of a massive home–remodeling project which promises to be as close as I'll get to "woodworking" for quite some time yet. I'm trying things I've never done before—things like framing and roofing—even some stone masonry. And even though these tasks involve some tools and techniques that are new to me, they also require skills that I've developed because of my woodworking. There is a whole way of thinking involved in any manual/mechanical job, and once you're used to working with your hands,you find that the different crafts are actually closely related and that you can apply lessons learned in one discipline to your work in another.

A case in point is the concrete slab foundation I poured for a storage shed in my back yard. I'm sure you're familiar with the technique of checking for square by measuring diagonally, corner–to–corner and comparing the two measurements; if the measurements are the same, the job is square. When I built the forms for the concrete, I had those diagonals within a sixteenth of an inch, but when the time came to frame the building, we discovered that the front was a full three inches wider than the back. (The friend who was helping me looked skeptical when I explained that the building was designed to have a slight taper.) That was the day I learned that equal diagonals don't tell the whole story. If you assemble something with a side that is supposed to nail *over* the ends, but you nail it *between* the ends, you can still get equal diagonals. Believe me, this lesson will be remembered when I get back to making furniture again.

This issue of *Popular Woodworking* has a metalworking project on page 38. Many woodworkers get a great deal of satisfaction out of making their own tools, so in "Making Chisels and Gouges" we ask you to put your manual skills to work in another discipline, as a change of pace and perhaps for the eventual betterment of your woodworking. Then, on page 41, it's back to wood again to make a box for your chisels that features some unusual joinery. Let me warn you, though: my shed turned out fine, but I recommend you try *not* to make your chisel box with a slight taper.

David M. Camp

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Course Comments

I would like to make some comments on the article "A Woodworking Correspondence Course" (Issue #43, June 1988) about Foley–Belsaw's woodworking program.

I am taking the course now and just finished Lesson 24. I like the course, but the tools are not too good. The table saw will not stay lined up, the try–square was broken when I received it, and they don't ever tell you how you are doing. I haven't heard anything from them; all I get back are my graded lessons.

Ralph Van Tine
Pleasant Grove, AL

Art vs. Legibility

Why are the "Wood Types" articles printed over photographs, making them virtually impossible to read? It seems a shame to take such fine writing and destroy it by a printing technique. Several of my friends have also commented that they consider it a challenge to their eyesight to be able to get through an article.

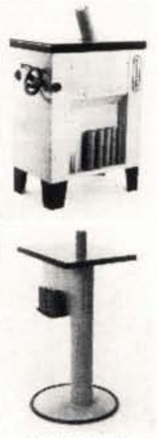
Would it destroy the editor's sensibility to print the articles on white paper? The information and photographs presented by contributing editor S. Reed Poverny are wonderful.

A. M. Fuller
Woodland Hills ,Ca

The editor replies: *I'm very glad you wrote. I try these things because I think they look nice, but since I'm trained as a woodworker and not a graphic artist, I don't really know if they work or not. Thanks to your input, I'm a little wiser; and you can be sure that from now on, you'll have no trouble reading "Wood Types."*

More Cordlessness

Shortly after our article "Cordless Tools" went to press, we learned that Hitachi Power Tools has introduced a cordless 3/8" driver/drill. Its two–stage, variable speed, reversible switch controls a 9.6 volt motor that is powered by a removable battery pack. The tool comes with a one–hour charger with automatic shut–off, as well as two driver bits. A spare battery pack is available.



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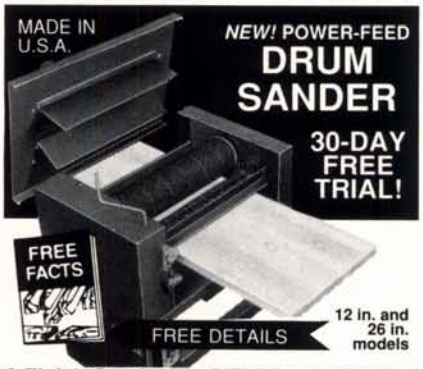

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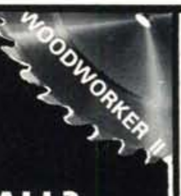

Jim Forrest, President and designer, mircoscoping cutting edge.

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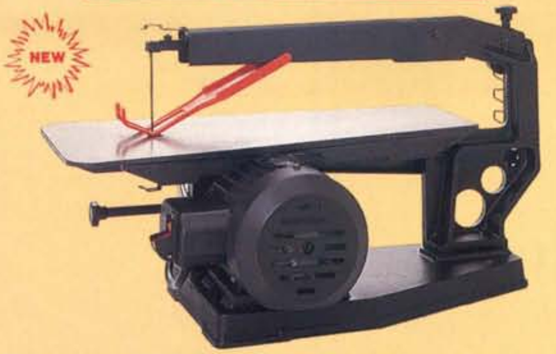

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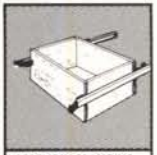

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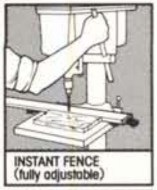

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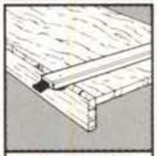

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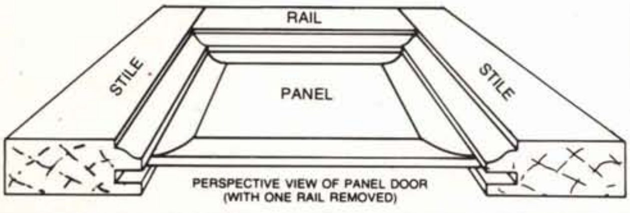

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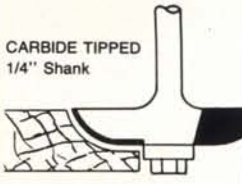

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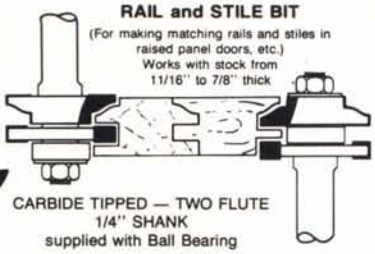

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The 89-page, spiral bound book contains nine detailed animal projects — cougar, rabbit, wolf, bird dog, bighorn, whitetail deer, mustang, unicorn and moose. Each pattern shows front, side, top and back views with special illustrations on carving ears, paws, hoofs, eyes, nostrils, etc.

These are action animals that can be carved singly or grouped, i.e. a wolf attack on a moose, or a deer, or bighorn, etc. With the aid of Mary Duke's patterns, a carver can pose his figures in any stance.

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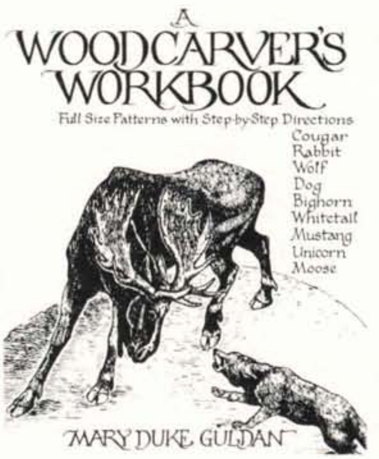

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Book Reviews

by Hugh Foster

On Furniture Design

Departing from this department's usual short review format, I'd like to take a closer look at two books that I've found helpful as I attempt to find my own vision and voice as a furniture designer. May you find them similarly useful.

How to Build Shaker Furniture by Thomas Moser with measured drawings by Christian Becksvoort (Sterling Publishing Co., 2 Park Ave., New York, NY 10016, ©1980) 208 pages, $12.95

I confess that I am an unabashed fan of this book. I have owned a copy since it was first published in 1977. Perhaps more than any other single volume, this one has shaped my thinking about the craft of building furniture. When I read Thomas Moser, I feel that I am in the presence of a kindred spirit, as well as one of the most important builders in North America. With that out of the way, let's get on to this most biased review.

Moser's rationale for the book begins with the mid-seventies' demand for greater craftsmanship and with the public's growing weariness of planned obsolescence. On the theory that truly excellent design is timeless, Moser looked for a model that combined integrity of construction with natural materials and purity of design. His study of history led him to the Shakers, who, by the second quarter of the nineteenth century, were flourishing both spiritually and economically. Their creed governed their work (as perhaps it should govern ours): "Work as though you will live a thousand years, but live as though you would die tomorrow." To them, ornamentation was vanity, useless ostentation. Simplicity was all.

Moser's audience for this book is the builder. He hopes the designs in the book are a continuation of and improvement upon the Shaker style. He suggests at the outset that synthesis is what the design process is all about, citing the creative process as described long ago by Homer's Ulysses: "I am part of all I have seen, and all that I have seen is part of me." Moser learned much of what he knows of design by repairing antiques, and he learned much more than the geometry of design, for he shares with us even the creators' attitudes.

In Chapter two, Moser writes almost poetically about his relationship with wood. In just sixteen pages he takes us from wood classification through supplies in a way that doesn't seem merely cursory or scanty. That chapter is just a warm–up for the next one, "Tools," which opens with a comment about the nature of workmanship. The real tool, Moser knows, is the brain that "drives" the hand. Tools are an extension of the spirit, not just the hand. His descriptions of tools are succinct and crystal clear. It's the only chapter of this type that I've ever read with much pleasure. This chapter seems obligatory and usually tedious in most of the how–to books I've read, but I've given or recommended this book to many novice woodworkers just for this excellent chapter. I wish I'd had it ten years earlier.

Moser's discussion of the building process is unparalleled. Learn to cut the joints, for sure, but *think*. Plan your work so it goes efficiently, without wasting either time or material. These are Shaker attitudes. My prejudices parallel Moser's closely, for the techniques he recommends are largely a matter of attitude, and this, no doubt, accounts for my favoring his book over other similar texts.

The fifth and final chapter fills about sixty percent of the book, and deservedly so, for it contains Moser's adaptations of fifty–one Shaker style projects including stools, chairs, cupboards, music stands, beds, tables, desks, and clocks. The descriptions of each include a photograph, a couple paragraphs of explanation (the origin of the design and perhaps some advice on the most complicated part of the construction), and a drawing that gives enough dimensions that a fairly inexperienced builder won't be lost. He doesn't give so many dimensions that the builder becomes just another machine. To build these pieces, one has to plan and think.

In short, Moser gives the thoughtful woodworker far more than just several dozen nice plans. Indeed, these are not plans, but merely suggestions; the book gives a short course on building and design, making it so palatable that a reader should be able to return to it time and again. Moser has inspired me to complete several elegant pieces in such a way that they are my pieces, not his.

Modern Furniture by John F. Pile (John Wiley & Son, New York, NY, ©1979) 191 pages, hardcover, $37.50

Check this one out from the library before you decide to buy it, because your local book store won't be discounting it. $37.50 is a heavy price for fewer than two hundred pages of text. But before you reject this book on the basis of cost per page, know that the pages are densely packed with thought–provoking information and ideas. In his introduction, Pile says his book is not intended as a how–to text for furniture craftpersons. There are absolutely no step–by–step plans in the book, so if plans are all that you are in the market for, this is not the book for you. On the other hand, the book will help you to understand why a perfectly reasonable drawing can result in a finished product that is "ungainly, uncomfortable, or fatally fragile." It's an extensively illustrated book about the principles of design.

Our knowledge of history is largely through our understanding of objects that have been left behind. How we design is how posterity will judge us. Designed items "look right." A good design is our ticket to immortality. There is more than just one right answer to any design problem. The designer tries to solve a practical problem artistically, and we judge that design in terms of function, structure, material, and workmanship as they combine to give us a transcendental communication of meaning. We should evaluate every piece we build in the manner of the sample evaluations in this book. Pile also advises us to collect a notebook of observations about the furniture we see.

The historical bases of design have been comfort, "off–the–ground–ness," and culture. The designer cannot safely rely on tradition, common sense, or instinct (at least until that instinct is highly trained). Modern life is hard on furniture, and design errors are costly, embarrassing, and add to the consumer's well-founded suspicion of the unfamiliar.

Engineering applies to the design of all projects in terms of stability (Will the piece remain in place?) and strength (Has

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***Hugh Foster** is an English-teaching woodworker in Manitowoc, Wisconsin.*

the piece structural integrity?). Pile discusses five categories for measuring strength: tensile, compressive, bending, sheer, and torsion. All of us are reminded that we must never rely on glue for strength; sound mechanical joints are a necessity. Glue exists merely to eliminate the rattles.

The designer must answer many questions about use: How do modern users move, sit, recline? Have their postures and habits changed from those of the middle ages or the intervening years? What objects do people own, store, and use? A further problem is that we are usually ready to discard an automobile after ten years or less of use, but we may well expect a piece of furniture to last a lifetime or longer, so people buy either conservative or inexpensive pieces. Modern furniture uses traditional forms and modifies them to suit current uses and production methods. Since hand labor is so rare and so costly, mass production must be the rule rather than the exception. "Modular" appears to be the style for the foreseeable future.

Pile contends that it's possible to be pessimistic about the future of fine furniture for many reasons, including scarce and expensive materials, rising energy costs and the notion that good furniture is so expensive as to discourage ownership. If we craftmen are to sell our well–designed, well–made, expensive furniture, we must help our clients to recover the sense of investment with utilitarian and aesthetic satisfactions. More simply put, people tire quickly of inferior design, but good goods have a long–lived holding power.

The first appendix offers eleven pages of standards for designing chairs, desks, tables, storage, and beds. Standard heights, widths, and lengths are given for many items, and scale drawings of the surfaces (only) of many items are given here. These pages alone might repay your initial investment. The second appendix is about the ethical and honorable alternatives to "knocking off" (read copying — or, more flagrantly, stealing) a design. The third appendix is a simple two–pager that deals with safety, not of the manufacturing process, but of the finished product. These considerations are important to us designer/craftsmen because we are probably liable (in a legal sense) when a client is injured while using our product.

The book's bibliography lists other important books relative to furniture design. As I study the list, I see only four titles that I recognize, and I thought I was fairly well–read in my field. I will be getting many of the titles from this bibliography, and you will be reading about them in forthcoming installments of this column. PW

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Videoscene

by Alan Marks

Moulding and Picture Frames with Avian Rogers and Les Cizek, ©1985 by Do It Yourself, Inc., 5250 Seventy–Seven Center Dr., Charlotte, NC 28210, 30 minutes, $19.95

This is the fifth in a series of six tapes from Do It Yourself Video Corporation, and I chose to view it because its subject matter is not covered elsewhere. It's also the first tape I've seen featuring a team presentation, to wit, Avian Rogers, a TV Do It Yourself series hostess, and Les Cizek, a woodworker and teacher. The six videos are an expansion of subject matter covered in a TV series.

I expected the tape to open with examples of mouldings and picture frames that can be made , but instead the instructor immediately runs through the steps to be covered in the forthcoming project. Most people, I believe, would want to see a completed project first. He refers to several highly specialized items with which a beginner may not be familiar: splines, miters, and rabbets, for example. True, a glossary of terms appears in the booklet which accompanies the video, but I discovered this later. Such lack of coordination weakens what otherwise could be an effective teaching combination. No mention was made of the booklet or how to use it in conjunction with the tape. Consequently, the booklet comes across like a parenthetic afterthought.

In the first section, called Preparing the Stock, a finger board is shown mounted on a table saw, but no explanation of what a finger board is or how to use it is given. At the end of the tape, in a special Safety Section, you can find the answer. There's no mention of what is contained in the Safety Section anywhere, and the booklet has no index either, so the only way you can find anything is by leafing through it.

The instructions given in this tape are grossly incomplete. It does not provide enough information for beginners to use, and I can't imagine why a professional would waste his time looking at it.

Building Tables with Avian Rogers and Les Cizek, ©1985 by Do It Yourself, Inc., 5250 Seventy–Seven Center Dr., Charlotte, NC 28210, 30 minutes, $19.95

This was the first in the series from DIY Video. In it you can learn how to build a simple table with a solid top, doweled rails, and square–tapered legs.

If you don't mind muddling through a lot of details not covered in this video and can tolerate making a few mistakes, you really ought to be able to build this table. There's a fairly decent explanation on the basic use of a jointer for edge treatment and how to use a taper jig on a table saw. Their idea of using plastic mirror clips to fasten the table top to the rails is one good way to avoid specialty hardware or sawing out your own hold–down blocks.

Avian recommends putting glue on both faces of a joint, which I never do. If you use her application method (smearing glue with a finger), it might actually be a good idea to put it on both faces.

When the leg and rail glue–up was done (with no mention at all of doing a dry–assembly first), diagonal measurements showed that it came out perfectly square the first time; why was there no instruction on how to proceed if it wasn't square?

And why sand before you use a router bit to chamfer or round over the table edges? The particles of sand left behind or imbedded in the wood dull router bits (or any other cutting edge for that matter). It makes more sense to sand afterwards.

The fact that I raise these questions reflects my reaction to the video, though I liked it better than the one on picture frames because it is more complete. Now for my final question: Why imply that the viewer is going to learn how to build that fancy table in the picture on the front of the cassette box, when the tape teaches you to build a totally different project?

Carving Techniques and Projects with Sam Bush and Mack Headley, Jr., ©1986 by The Taunton Press, Box 355, Newtown, CT 06470, 90 minutes, $29.95 or $14.95 as a rental

In this video, two accomplished carvers demonstrate their techniques. Having done some relief panels myself, I have some appreciation for what is being taught here, and to my knowledge, this is the only tape available *on carving incised* letters and low relief.

The close ups in this tape are excellent. Bush's clear commentary helps immensely. He also has much of value to say in the booklet that supplements the visual instruction. Carving can be such a pleasure when grain is cooperative and your tools are razor sharp. Once you've tried it, watching somebody else do a masterful job of it is pure pleasure.

I was particularly impressed by Sam Bush's presentation. Bush's technique leaves nothing to be desired. He is a good craftsman and expresses himself with precision and clarity. His demonstration reflects the eleven years he spent teaching the craft and the twenty-two years he has been carving. Among other things, Bush shows how to use specialized tools. He uses a skew chisel to advantage and demonstrates one application of a short bend tool. He introduces and completes two projects—incised lettering and a capital letter in relief.

Letters are of great value in practicing carving because if you make an irreparable mistake incising one, you have not lost much in the way of time and effort. If an enthusiastic beginner attempted to carve an entire panel in relief and muffed it somewhere halfway through, it might well deal a death blow to his budding career. Almost all the basic techniques of dealing with grain direction and breakout can be learned from carving letters.

As his contribution to the tape, Mack Headley carves a shell in low relief. I found his explanations confusing from time to time. He is an excellent, sensitive carver, but as an instructor he tends to intellectualize instead of coming straight to the point. This might be a problem for others besides myself. By analogy, comparing Bush's *instruction* with Headley's, I would describe Bush as a potentially good joke teller, where Headley might complicate the joke unnecessarily and then blow the punch line. Still, most of what he does convey clearly has great importance.

Anyone wanting good instruction in relief carving should get this valuable tape. **PW**

***Alan Marks** is a cabinetmaker in Carmel Valley, California, and a contributing editor to* PW.

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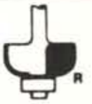		COVE				
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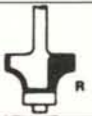		ROUND OVER				
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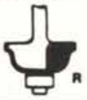		ROMAN OGEE				
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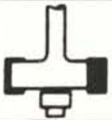	#11	3/8" RABBETING	Deep 3/8"	1-1/4"	1/2"	$14.00
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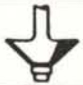
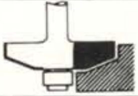
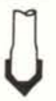
	#12	45° Chamfer	45° Angle	1-1/2"	5/8"	$15.00
	#15	Raised Panel	20° Angle	1-5/8"	1/2"	$25.00
	#35	1/4" V Groove 90°		1/4"	1/4"	$ 8.00
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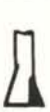	#16	3/8" Dovetail 9°		3/8"	3/8"	$ 7.50
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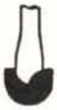		CORE BOX (ROUND NOSE)				
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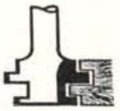
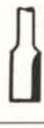
	#056	Tongue & Groove (FOR WOOD THICKNESS FROM 1/2" to 1")		1-5/8"	1"	$30.00
	#24	1/4" Straight Bit		1/4"	3/4"	$ 7.00
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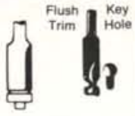 Flush Trim Key Hole	#13	1/2" FLUSH TRIM		1/2"	1"	$ 8.50
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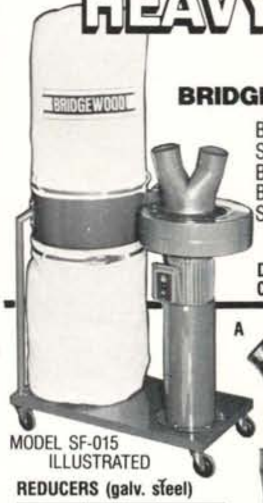

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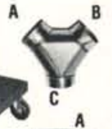

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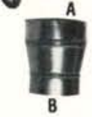

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The Business End

by William L. Smith

Depreciation Tax Savings for Woodworkers

Understanding the business tax depreciation deductions available to the woodworker can save you tax dollars!

Depreciation rules are not exciting. Not, that is, until you take the time to realize how many tax dollars can be saved by proper planning and record–keeping.

It seems there is always a new tool or machine that the woodworker has on the "wish list" to add when funds are available. If that new tool or machine is used in the business end of woodworking (used more than 50% for business) it will generate the best tax shelter left to the small business owner. This benefit is called Expensing. It provides that for the first $10,000 of purchases of otherwise depreciable property (tools and machines, for instance, along with other furniture, fixtures and vehicles) the entire amount paid may be deducted in the year of purchase.

Why is this important? What makes it exciting? How does this differ from ordinary depreciation tax deductions?

Let's say that Jack buys a new wide belt sander for his woodworking shop that is totally devoted to his business activities. The total cost is $8,400.

Using normal 7 year, 200%, mid–year convention depreciation rules, the tax deduction in the year of purchase would be $1,200. Jack needs to consider three factors in deciding what deduction to take. He must understand that if he does not keep the machine for the 7 year expected life, he may have to pay back some of the money he deducted. Additionally, the expensing rule (also called Section 179 Deduction) is limited to the amount of taxable income without taking a deduction for the cost of any Section 179 property. For instance, if Jack had taxable income of $5,300, his expensing limit would be $5,300. The $3,100 excess may be carried over to the next tax year and added to the cost of any qualifying property he might place in service in that next year.

Even where there is the limit, Jack received the benefit of $4,100 more tax deduction than he would have with normal depreciation and so he paid no tax this year. In addition, these deductions are determined without regard to the method of payment for the sander. Whether Jack pays for it in a lump sum or by installments over several years, the deduction options are the same.

But what if you expect your income to rise and need the deductions in future years? Presumably the new equipment will provide increased productivity.

Earlier I mentioned the "normal" deduction method, more correctly called the modified accelerated cost recovery system or MACRS. This includes a 7 year life, 200% accelerated depreciation, and a mid-year convention for the type of equipment discussed here. There are different provisions for other classes of purchases, for short years and for the situation where more than 40% of purchases take place in the last 3 months of the year.

The other more conservative depreciation method is the long–standing straight–line method where the cost basis is divided evenly over the recovery period. Jack would have a depreciation deduction of $600 in the first and last year with $1,200 each year in between.

If the property in question is used partially for non-business purposes or is not used for business purposes during certain periods of time, special provisions apply which are beyond the scope of our discussion here. As with any tax matter, always consult your personal tax advisor before making a final decision in your unique situation. Equipment purchases and related depreciation decisions can have a greater impact on your taxes than almost any other single factor. **PW**

__William L. Smith__ owns and operates a Comprehensive Business Services franchise in Tucson, AZ specializing in accounting, tax, and business consultation services to small businesses and self–employed professionals.

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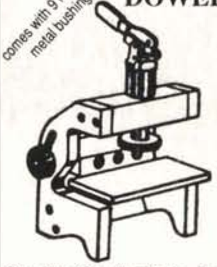

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A Tax Terminology Break

"Mid–year convention" refers to the practice of treating the year of purchase as a half–year for depreciation purposes—as if the purchase had been made at "mid-year." This practice also then provides for a final half–year at the end of the depreciation period.

Using the example of "7 year, 200% mid–year convention" depreciation as mentioned above would then be as follows: First, determine that one–seventh as a decimal is 0.1428571. 200% of this is 0.2857142. This is the percentage to use each year of the remaining cost basis to determine the appropriate depreciation amount for that year. Using a $10,000 cost basis purchase, the first–year depreciation would be determined by multiplying the percentage by the cost basis (0.285714 × 10,000 = 2,857.14). Since this is the first year, however, and we have the mid–year convention, the depreciation amount to use is one-half of this amount or $1,428.57.

The second–year depreciation calculation begins by determining the new cost basis (10,000 - 1,428.57 = 8,571.43). Next, multiply the cost basis by the "200%" percentage (8,571.43 × .2857142 = 2,448.98).

In the third year use 8,571.43 - 2,448.98 = 6,122.45 as a cost basis and so forth. In the year in which straight–line depreciation ($10,000 divided by 7, in this case), or 1,428.57) exceeds the "200%" amount, a switch is allowed to straight–line to finish out the depreciation.

The advantage of the "200%" method is that it provides the maximum annual deduction allowable and reduces taxes the most the quickest. Straight–line depreciation spreads out the allowable depreciation deduction the most. Other methods fall in between these two. If it is desirable to spread out the deductions over several years, the straight–line method would be the best.

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The Editor
The Woodworker's Journal

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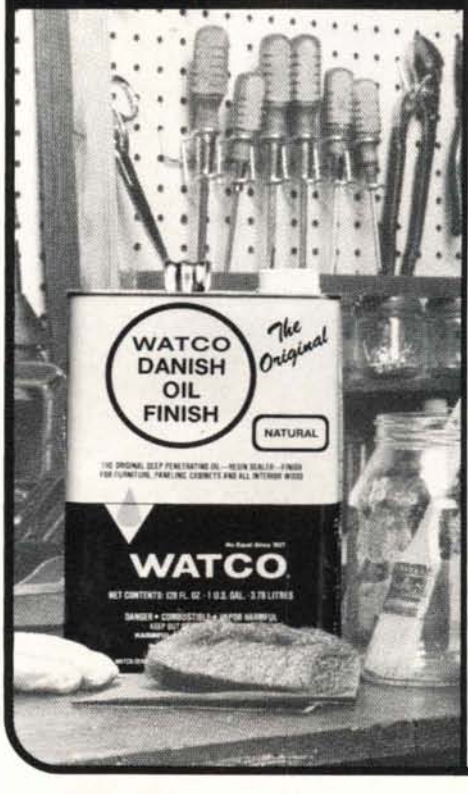

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Tests & Comments

by Hugh Foster

Inca's #280 10" Table Saw

When I was invited to sample the new Inca #280, 10" table saw, I thought I'd be in for a real treat, a version of their #2100 (reviewed in *Popular Woodworking* Issue #34) that I could actually afford. Since the tool was not yet for sale in this country, there was no price on it. My friendly Inca dealer had both saws in his shop. Next to the 12" saw, this new one is almost diminutive.

Inca's new 10" tilting–arbor saw (shown here with several accessories) has a table size of 22" X 27".

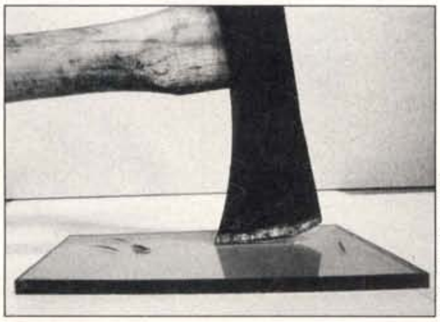
photo courtesy of Garrett Wade Co., Inc.

The machines differ other than just in size. The mortising table for the big saw is a rock–stable 92 pound behemoth that cost around $1,200 a year ago. Only one thing could have made that table better: the work surface could have been higher. The same complaint goes for the mortising table for the #280 as well. On the other hand, it appears to be the same mortising table that Inca has made for its smaller saws over the years, so it should be nearly a thousand dollars less expensive.

Inca has done a remarkable job of preserving the features of their big saw as they produced this model. The model #280 has the nifty multi–height rip fence, the adjustable miter guide, and loads of safety features. Since it's likely to be far less expensive than the #2100, it might be considered a bargain, but, sad to say, it's just not exciting. I can't give it the unqualified recommendation that I will *still* give the bigger saw. You may recall that I closed my review of the bigger saw asking Santa to please remember me with one. Well, Santa, I still want an Inca saw, but, since you never do anything half–way, bring me the big one, okay?

GE Margard® Sheet

Several Sundays ago I went out into rural Manitowoc County to see a fellow's shop–made biscuit joining machine. While the machine wasn't the sort of thing you'd give up your Lamello Top for, its guard, made of General Electric's Margard®, should be of interest to anyone who makes jigs and fixtures at home. Using cutter guards made from this clear plastic material should be a mandatory safety feature on every shop–made fixture. The design of your guards won't change much, but the material will make them much safer.



If you make jigs or set up your own equipment, make see–through guards for these devices out of shatter–resistant Margard®

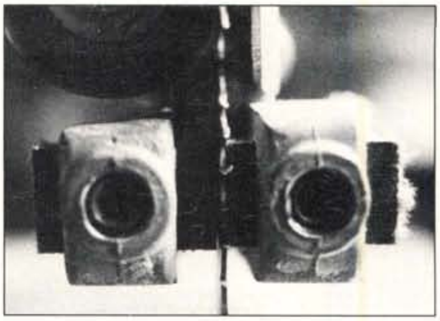
photos by the author

After I made that visit, I had occasion to visit a local glass shop. While I was there, I asked about this Margard®. The glazier gave me a really eye–opening demonstration: He put a piece of Margard® scrap on the concrete floor and then took after it with a pick–axe. After three or four good, healthy hits, he stopped and gave me the abused sample. I added some damage of my own to it with my very sharp sculptor's axe, hitting the plastic hard enough to make the axe stand up in it, but I couldn't break it. There were pick–axe dents in it and other visible damage as well, but the structural integrity of the sheeting is still perfect. The material is strong enough to be used for windows in the world–famous Manitowoc cranes.

More than any words I could say, the photo above may indicate why you'd like to have a sheet of this between you and an exploding cutterhead. If a bit comes loose in my router table, I'm going to have a piece of this between it and me – it'll be worth many times its price if all it does is slow the shrapnel! Speaking of price, Margard® costs $12 per square foot if cut directly from the 4' x 8' sheets, but you may be able to talk your glazier into discounting or even donating small or odd–shaped cut–offs. Even with all its strength, the material is easy to work, it can be easily cut with any of the standard shop saws. Using this material might one day save you from serious injury.

Cool Blocks

Cool Blocks are replacement guide blocks for your band saw. A couple of months' use makes me wonder why they aren't standard equipment on all band saws. Cool Blocks are available for Delta, Inca, Craftsman, and other band saws. Here is what they have done for my band saw:



Cool Blocks eliminate a lot of band saw play because they can be mounted very close to the blade.

Never before have I had guide blocks set so close to the blade. The manufacturer claims that this dry, self–lubricating material leads to longer blade life because the blades run cooler. Less friction means less heat and less metal fatigue; this phenolic–like material cannot damage the blade teeth, and since the blocks cost less than the price of a single blade, your investment will soon be returned. Additionally, band saws run smoother and quieter with Cool Blocks; readings on my Sound Meter showed them to be 3 dB quieter than the steel blocks; I'm guessing that the relative "tightness" of the guide blocks has a great deal to do with the sound dampening.

The instruction manual says that a dollar bill is .004" thick—exactly the right thickness for adjusting the Cool Blocks to the blade. My metal blocks weren't nearly that close—are yours? If they aren't, you owe it to yourself to tighten up your machine, and the $9.95 cost of Cool Blocks is well worth the price of admission. They are available from: The Garrett Wade Co., Inc., 161 Avenue of the Americas, New York, NY 10013. PW

***Hugh Foster** is a part-time furniture designer/builder in Manitowoc, Wisconsin.*

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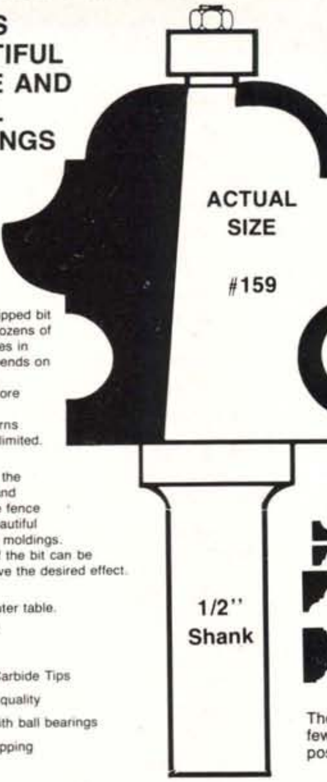

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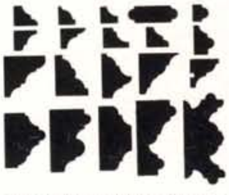

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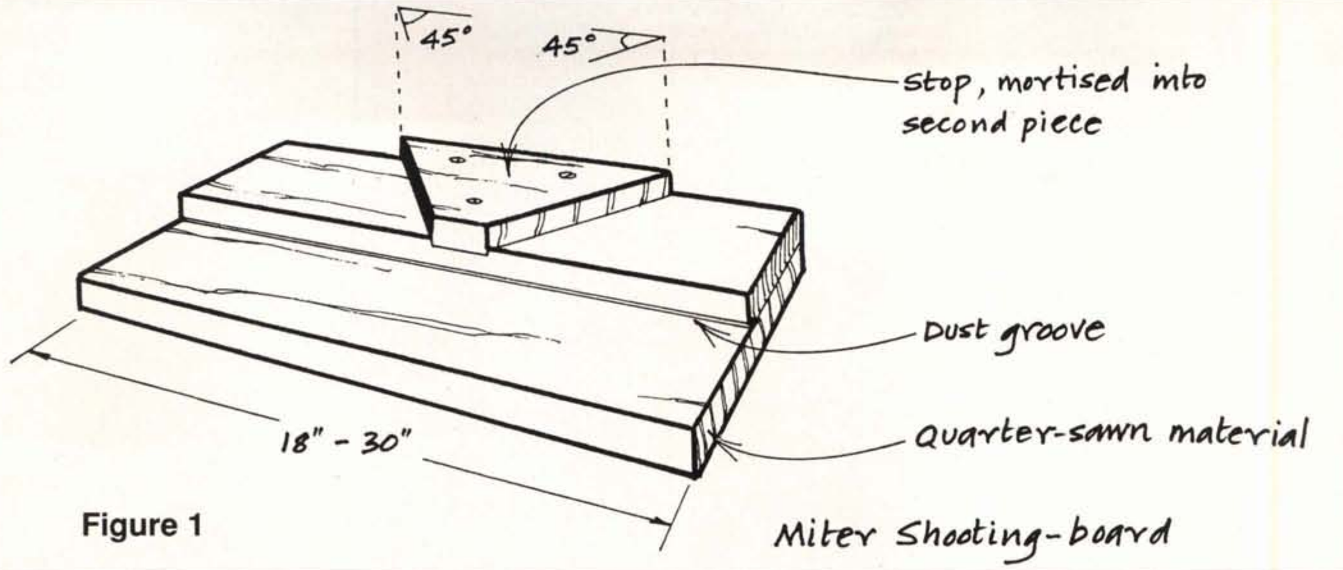

Figure 1

Many of today's woodworkers, if faced with the job of cutting a miter without the aid of the trusty table saw could, no doubt, do the job by hand. After all, much of the preparatory work for any project still has to be done by hand. We have to measure with a tape or a rule, and we have to use try–squares and bevels to mark where the cuts must be made. Making the cut by hand is just a short step from bringing the work to the machine.

What happens after the cut has been made is another story. If the miter is relatively small, and has been made in a regular, rectangular piece of wood, and if the operator has used a sufficiently sharp and fine–toothed saw and a miter box with saw guides and clamps for the stock, the cut is probably quite accurate. But if the miter is to be cut in larger or irregularly shaped stock, the job may be regarded with a certain amount of apprehension. If anything goes the slightest bit askew, and you have to do some trimming, then the chances are good that the job will have to be started over or accepted as less than perfect. Taking a plane to the surface of a miter joint is an extremely risky proposition for any but the most skilled—those possessed of a keen eye, a firm hand, and a very sharp plane.

Cutting an awkward or irregular miter is the kind of operation that causes many a beginner to despair of ever producing competent work with tight joints, and also causes even more experienced workers to wonder at the apparent skill of the old-timers who worked without benefit of such marvels as the table saw and the radial arm saw.

The truth is that although they didn't have the power tools we enjoy today and were consequently more used to working with handtools alone and more skilled in their manipulation, the "old–timers" had a few tricks up their sleeves. While many of the tools themselves that were used in pre-power tool days are still with us and even used by us, many of their adjuncts—the jigs, gauges, and assorted implements that accompanied them—have been forgotten.

Miter Shooting-Board

The simplest of the various appliances devised for ensuring accuracy when trimming miters is known as the miter shooting–board (see Figure 1). This operates on the same principle as a regular shooting–board for trimming square cuts; it holds the work so that a plane may be presented at the correct angle to the face to be trimmed. Whereas a regular shooting–board is fitted with a stop mounted at right–angles to the path the plane takes, the miter shooting–board's stop is mounted at 45° and *in the middle* of the shooting–board, rather than at one end, so that it may be used from either direction.

Miter shooting–boards are invariably user–made since their construction is so simple. All that is needed are three pieces of fairly dense, straight–grained material —such as maple—quarter–sawn to minimize warping and wear longer (side grain wears better than face grain). The bottom piece may be from 18" to 30" long by roughly 1" wide. On top of this, just as long but only half as wide, the second piece is fixed. This forms a wide rebate in which the plane rides – on its side. On the very top, the short third piece is fixed. The work is held against this stop so the face of the miter to be trimmed hangs over the wide rebate very slightly.

When making a miter shooting–board, two tips are worth bearing in mind. First, provide a dust groove by chamfering the bottom of the second piece. Without this there is the risk that the sole of the plane may be forced away by dust build–up, and you will no longer be trimming the miter at an exact 45° angle. Secondly, take the time to mortise the stop into the top of the second piece. This obviates the danger of the stop being pushed in the direction of the planing – with similarly unfortunate results to the accuracy of the trimmed face.

Providing the stop is cut and affixed carefully so the angle formed between the work and the plane is exact, and providing

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***Graham Blackburn** is a furniture designer/ maker in Soquel, California and the author of many books on woodworking and home maintenance including* Floors, Walls and Ceilings *which is to be published this fall by Consumer's Union.*

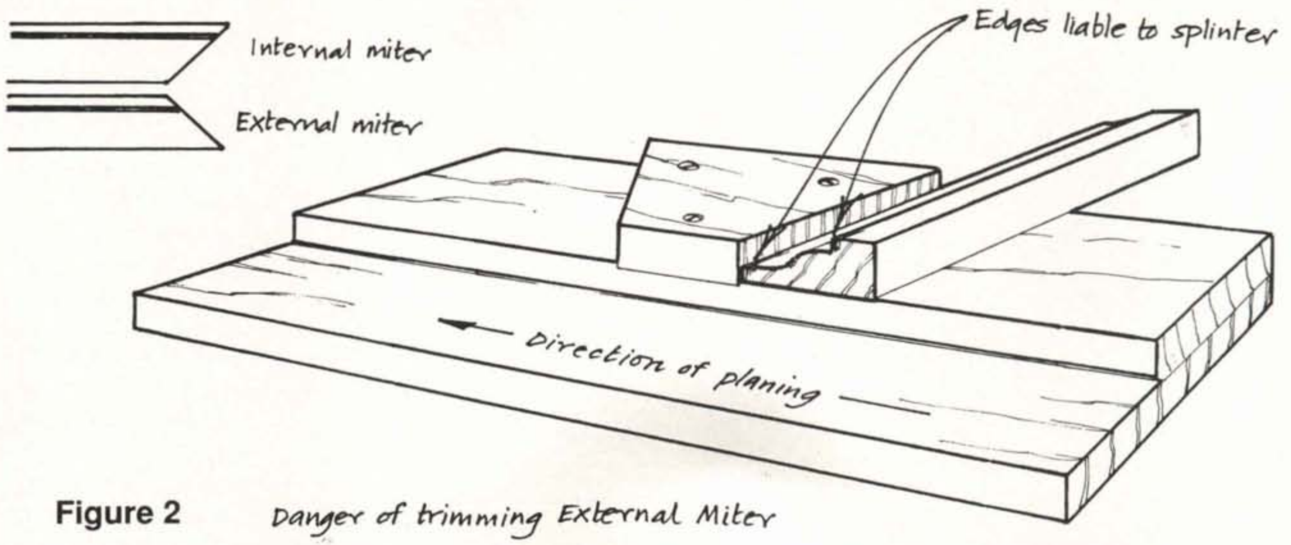

Figure 2 Danger of trimming External Miter

the bottom piece is flat and lies in a perfectly parallel plane to the top of the second piece (on which the work rests), this is a foolproof device. Of course, a plane whose sides are at perfect right angles to its sole is also required, but most of today's low–angle block planes are usually quite exact. Before the advent of the metal block plane one would have used a miter plane with the miter shooting–board. Metal or wooden, these planes had low angle blades and straight, parallel sides, which made them easy to hold and work in the sideways position required by the shooting–board.

The miter shooting–board is ideal for trimming internal miters of relatively small stock, such as applied mouldings. However, be aware that unless the plane iron is very sharp and set very fine, unsupported corners of *external* moulded miters are liable to be splintered off as shown in Figure 2.

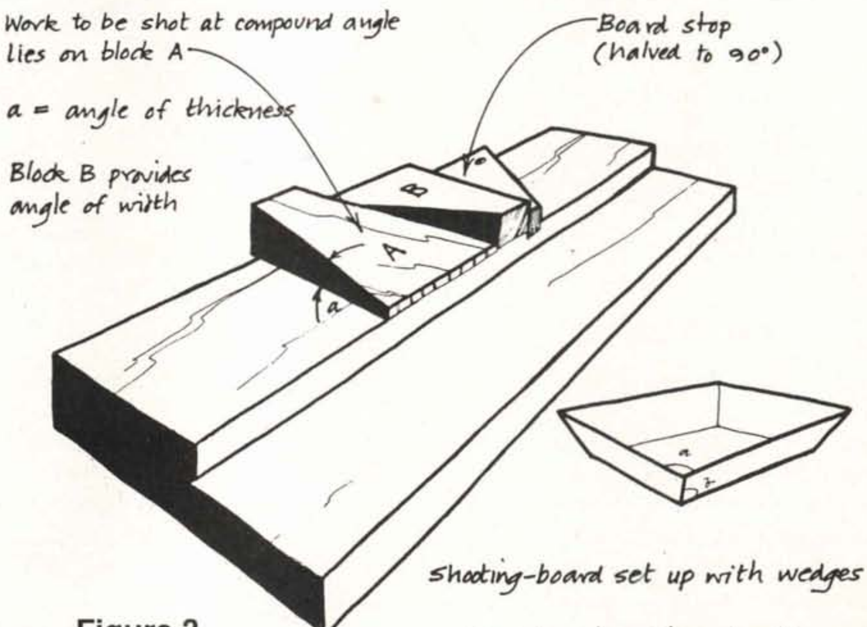
Work to be shot at compound angle lies on block A
Board stop (halved to 90°)
a = angle of thickness
Block B provides angle of width
A
B
a
a

Figure 3 shooting-board set up with wedges for trimming splayed miters

Illustrations by the author

By fixing stops cut at different angles, miters other than those of 45° can be trimmed. If you have much work to do at certain angles, you may find it practical to make a series of interchangeable stops which fit in the same mortise.

An additional level of sophistication can be achieved with the use of appropriately cut wedges on which the work is rested. Used in conjunction with the differently-angled stops mentioned in the previous paragraph, these wedges permit the exact trimming of compound miters, such as may be encountered in splayed work. Determining the shape and size of the wedges and the stops is made clear in Figure 3. Supporting the work on these wedges can be a little tricky; securing it with a bench holdfast is the easiest way, but with a little ingenuity, other clamps can be arranged to do the job.

The only limit to the size of a miter shooting–board is the width of your largest low–angle plane's iron. If you need to trim miters that are larger than can be accommodated by the miter shooting–board, recourse may be had to two other miter trimming devices: the donkey's ear shooting–board and the miter shooting–block.

Donkey's Ear

The donkey's ear shooting–board is used for trimming tall, narrow miters, such as are required when fitting tall baseboards or moulded skirtings (see Figure 4). It's actually the same beast as a regular shooting–board except the bed on which the work rests is made at 45° to the board on which the plane runs and the stop is

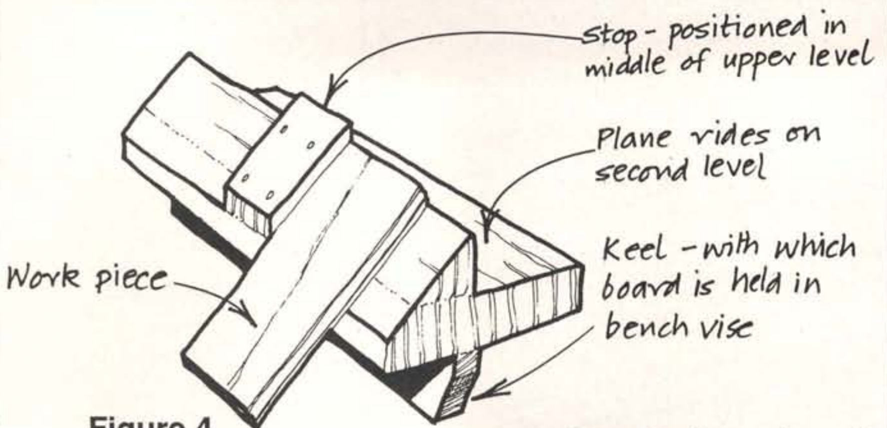
Stop - positioned in middle of upper level
Plane rides on second level
Keel - with which board is held in bench vise
Work piece

Figure 4 Donkey's Ear Shooting-board

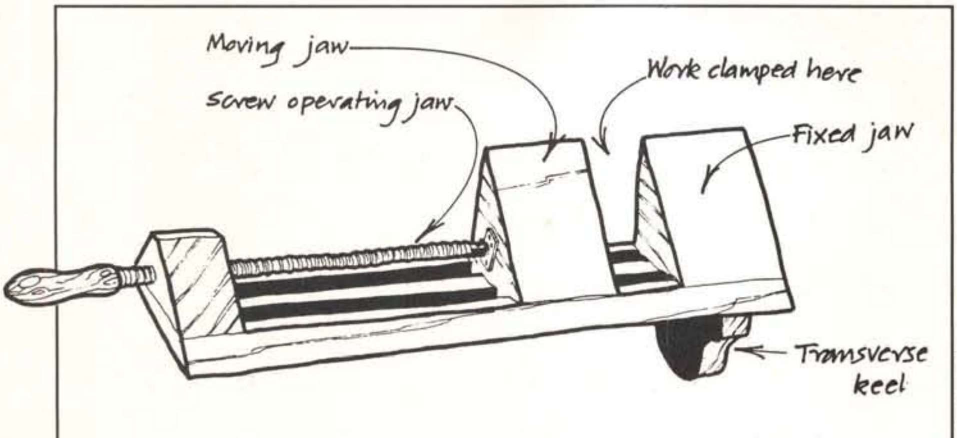

Figure 5 Left-handed Miter Shooting-block

illustrations by the author

centered in the board's length instead of being fixed at one end.

The work being trimmed is frequently quite long which forces the shooting–board to be positioned close to the edge of the bench so that long pieces of wood can hang over the side of the bench. To accommodate this need, the shooting–board is fitted with a keel–like member which can be held in a bench vise. The same could be done for the miter shooting–board but is generally unnecessary since the work is usually smaller and the shooting–board can be held sufficiently secure simply by holding it against a bench dog or bench stop.

When trimming a tall miter, it's generally best to work in from the top of the work, which will require holding the work against the appropriate side of the center stop. In this way, any tendency to split off the end of the miter is restricted to the bottom of the miter, where it will matter less.

Miter Shooting-Block

For large miters of any size or shape the miter shooting–block shown in Figure 5 is indispensable. This device is invariably fitted with a keel that may be clamped in the bench vise. Cabinetmaker's benches fitted with side vises and tail vises permit it to be used in a variety of directions according to whichever way is most convenient for the work concerned.

The miter shooting–block consists of two jaws: one that is fixed, and another which may be moved by a long screw so the work may be clamped securely between the jaws. The trimming plane rests on the wooden jaws, and is moved over them in any direction so the miter being trimmed may be approached from the best angle. This is usually *into* the miter if the work is moulded and not all sides are supported by the jaws of the miter shooting–block. To protect the jaws themselves from being planed away, glue thin sheets of card or cardboard over them.

Many of these miter shooting–blocks are found with jaws that have been abused and therefore require careful trimming to be made true. Furthermore, since they are frequently quite large, the jaws may be made up of several pieces, which may have shrunk or warped at different rates. But do not despair, for all that is really necessary is simply that both jaws be perfectly flat and lie in the same plane. Since the work is held between the jaws, it may be fixed at any angle without necessarily having to lie on the frame of the block. It is, of course, preferable if the work can be supported by the frame, and this requires that the faces of the jaws be at a perfect 45° angle to the frame, but frequently the work itself is of such dimensions that it cannot be held against the frame anyway.

Both left–handed and right–handed miter shooting–blocks may be found, but most work can be accomplished on either variety. The difference lies in which end the moving jaw is found when the sloping sides of the jaws face off the bench; if the moving jaw is to the right, it's a right–handed miter shooting–block, and vice–versa. The vertical side of the jaws allow the device to be used as a regular shooting–board.

Adjustable Shooting-Board

Although discussion of a regular (90°) shooting–board is not strictly within the purview of this article, any shooting–board that is provided with some form of adjustable stop, automatically becomes a form of miter shooting–board, since a miter is, by definition, the joining of two pieces of wood at any angle *other* than 90°. A regular wooden shooting–board is not easily fitted with such an adjustable stop—it's far simpler to provide a different stop, angled as desired, than to attempt to adjust the primary right–angled stop. However, around the turn of the century, those remarkable inventors of plane technology, Justus A. Traut and E. A. Schade (without whom the Stanley Rule and

Level Company would have had a far smaller inventory of tools), developed precisely such a device with a special plane to go with it that was especially suited to being used on its side. Accordingly, in 1905 the Stanley Chute Board and Plane was put on sale – and remained in their catalog until 1943.

Although the Stanley Tool Company is to be credited with having resuscitated English names for tools, it curiously chose to avoid the use of the English term "shooting–board" (which was in general use everywhere in America) in favor of the French derived term "chute board." Despite the strange nomenclature, the device was a great success with patternmakers and cabinetmakers, as well as with printers and electrotypers, all of whom were required to work with exceptional accuracy.

Other manufacturers offered adjustable metal shooting–boards but none is so common as the Stanley model; all are worth having, and will be found to make accuracy easily attainable when trimming a miter of any angle.

Miter Template

Another mitering device, much smaller and usually made of wood (but which has also been manufactured in metal by various companies over the years) is the miter template. Often referred to as a "templet" (especially in Britain, where "miter" is also spelled "mitre"), this is used for guiding a chisel when trimming stuck mouldings on mortised and tenoned framing as shown in Figure 6. In section, this is an L–shaped device with both sides of the long arm making an angle of 45° from a center line. When pressed against the side of the framing, a chisel held on the template's long arm will trim any moulding to a perfect miter more nicely than any scribed joint and without the unavoidably fragile thin edge that a scribed joint creates.

While metal templates may be more exact than wooden ones, they are also more easily bent out of true or broken when dropped. Furthermore, a wooden template is less likely to damage the edge of a chisel – or the work it is held against.

Miter Trimmer

Another device that originated in the nineteenth century, but which is still made and sold today, is the miter trimmer – sometimes called a miter machine (see Figure 7). This tool actually sits on the border between miter–*making* tools and miter–*trimming* tools, but is properly used to finish an already roughed–out miter. Developed primarily for use with small mouldings and picture frames, some of these trimmers are actually large and powerful enough to cut through fairly substantial pieces of wood.

In use, the work is held on the integral table of the tool and secured at the desired angle. A powerful lever then lowers the blade or blades, set in guides, into the work.

This survey of miter trimming aids should open up vistas of new possibilities next time a miter cut on the table saw is not quite perfect; a sharp plane and the right accessory can put you back on track without wasting valuable wood. PW

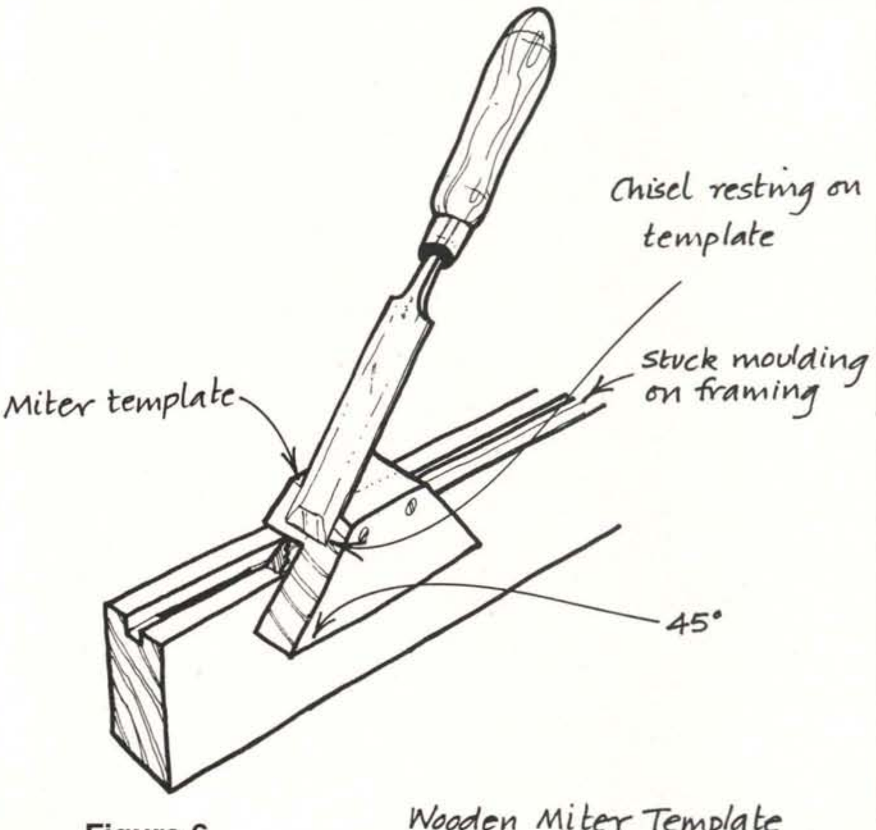

Figure 6 Wooden Miter Template

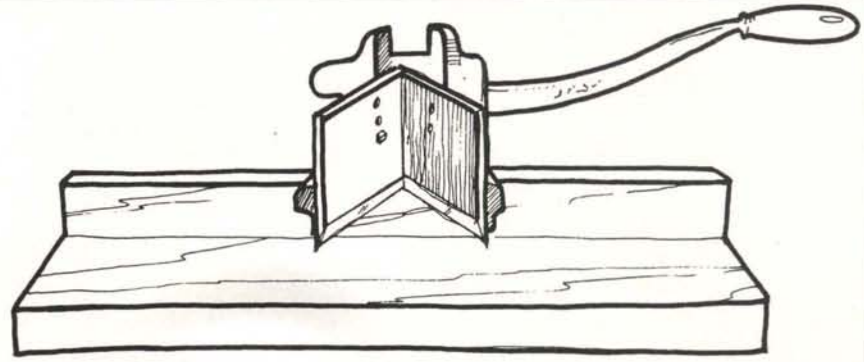

Figure 7 Miter Trimmer

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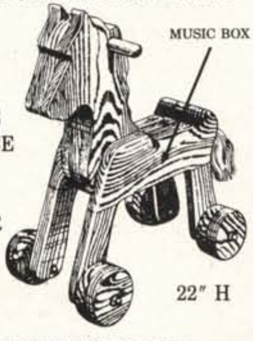

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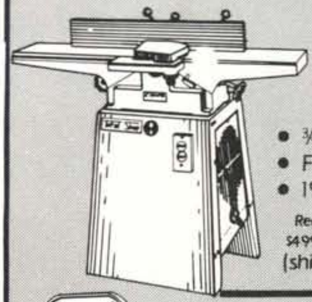

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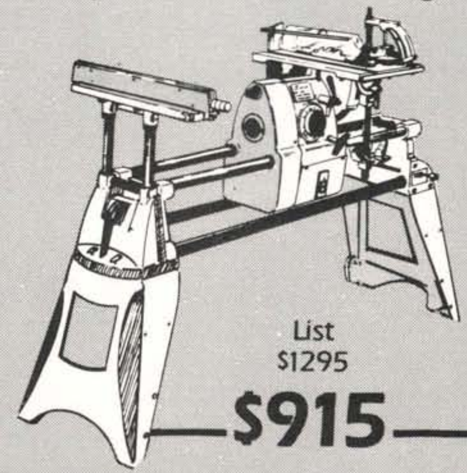

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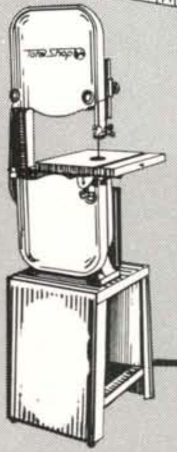

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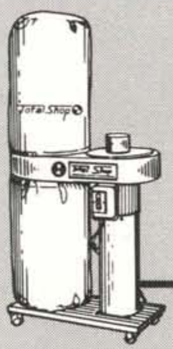

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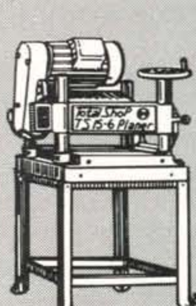

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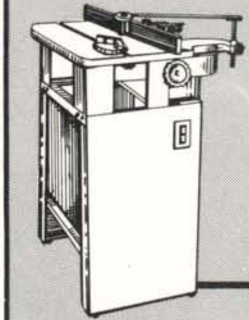

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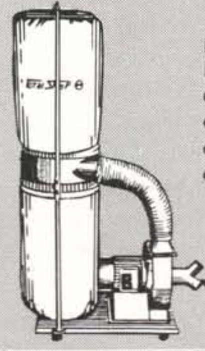

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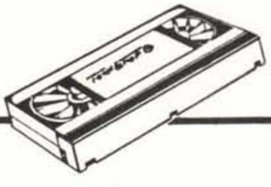

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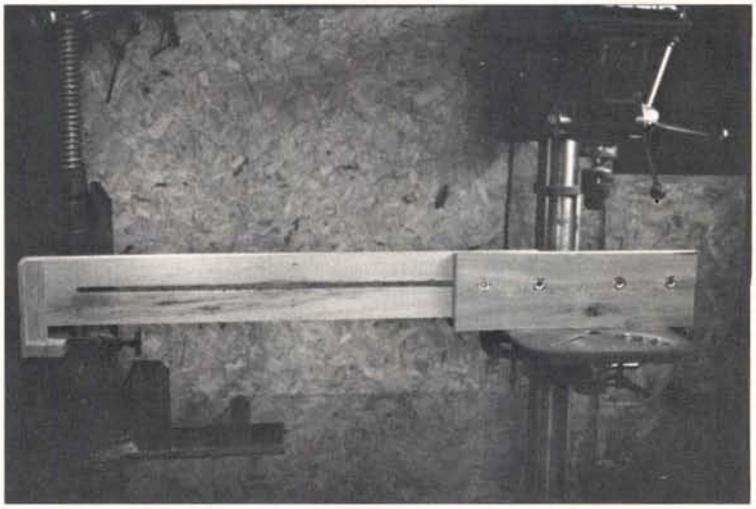


by Dana Martin Batory

I enjoy building Shaker furniture, but the work always seems to require gluing up long narrow boards into wide boards for tops and cases – a job I don't enjoy. I usually make these edge–to–edge joints by doweling, and after gluing, pass the piece through my 24" planer. But dowel joints are unforgiving – the holes must be precise.

I used to mark and drill each hole separately on my drill press, but besides being time–consuming, it was inaccurate. The holes were often just enough off to spoil the entire joint. What I needed was a way to drill repetitive holes and at the same time, keep the long boards locked in position. My adjustable drill press stop was the result of a few hours of designing and building. So far it has performed well.

Construction

I made my stop from red oak lumber salvaged from a discarded pallet, but any hardwood could be used. As designed, the jig makes it possible to edge–drill to the center of a 78" board, and at any point in between. Board width is restricted by quill travel, bit length, and chuck diameter, but if you cut a notch in the fence that's the same diameter as the chuck, you'll have more clearance to allow longer travel. I seldom work with lumber that's less than 3" wide, so I didn't notch my fence.

Cut the parts to size according to the cutting list. Experiment on some scrap lumber to determine which drill bits to use and how deep to countersink for the T–nuts which help secure the stop. I used a 1" spade bit to countersink the flange of the T–nut and a 1/2" brad–point bit for the shaft. Drill these holes in the fence (A) on center at 2" and 6" from each end. Use the bolts to draw the nuts flush with the surface of the fence.

If you decide to notch the fence, do so before you attach it to the base (B). Use glue and countersunk screws to join the base and fence.

There are several ways to cut the slot down the center of the slide (C). It should stop at 3-3/4" from the right end and 2-1/4" from the left end. You could set up a table saw to cut a 7/16" wide slot and raise the blade into the material to start the cut, then lower it at the end of the cut. If you do this, clean up the ends of the slots with a chisel. A router table and a straight bit are another possibility. I chose to clamp a board across the drill press table to act as a fence, drilled a series of overlapping 7/16" holes, and then dressed the slot with a file.

The stop assembly is made of three parts: the backrest (D), which supports the back of the workpiece even with the fence, the bottomrest (E), supports it even with the drill press table, and the endstop (F) ties it all together and is the actual stop for referencing the workpiece.

Glue and screw the bottomrest to the backrest and then join this unit to the slide in the same way. Make sure the bottomrest will be flush with the drill press tabletop by temporarily mounting the slide and double–checking the position. Glue and screw the endstop to the slide and backrest.

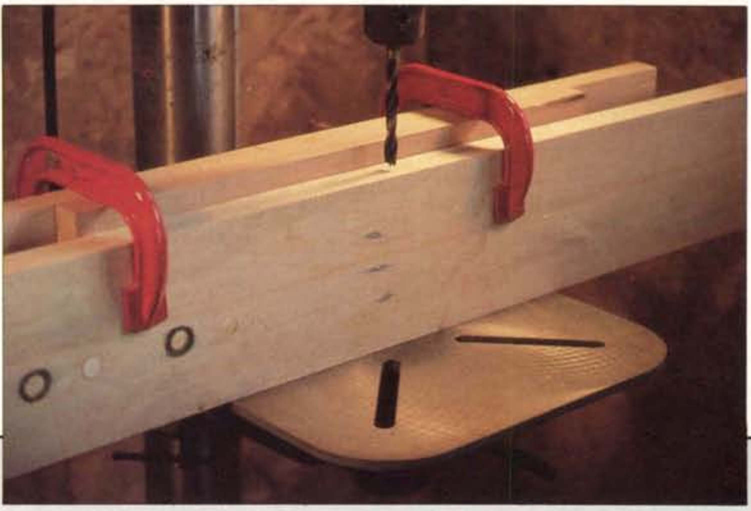
Sand and varnish the entire jig, and follow up with a coat of paste wax so the slide will run smoothly. Corrections or fine–tuning of the stop can be done by adding thin shims of cardboard or wood at the appropriate spots on the stop assembly.

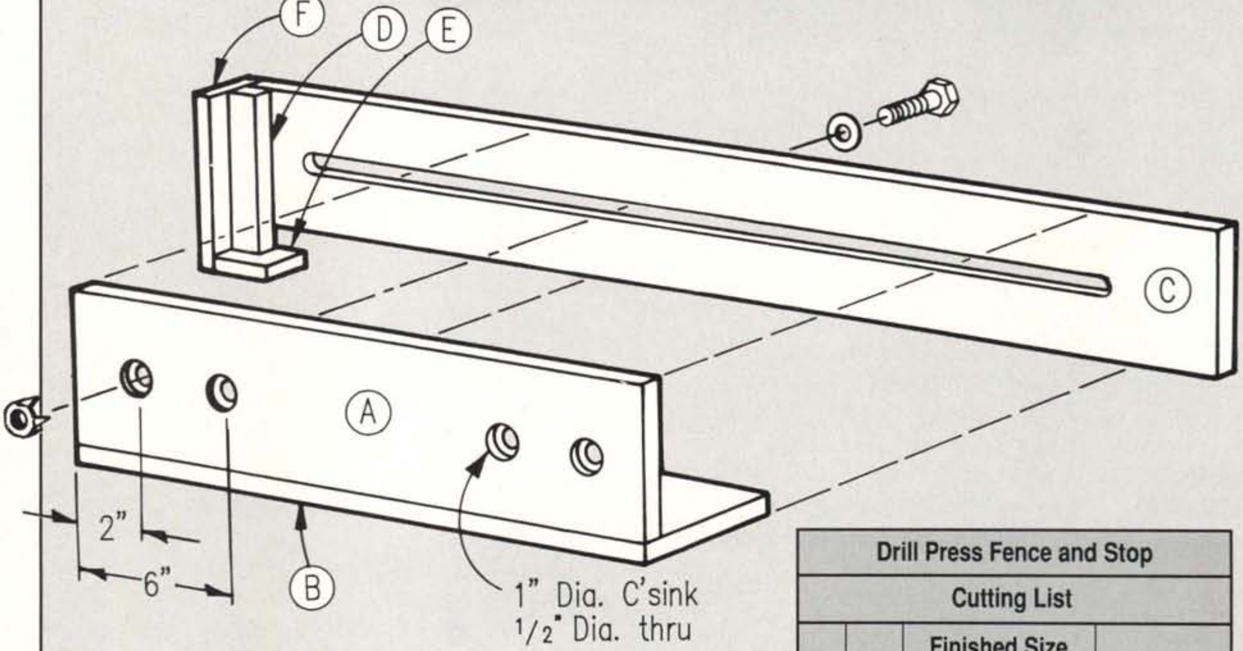
Using the Jig

Mark dowel locations on one master board. Align the stop, board, and drill bit with the initial mark and clamp the jig firmly in position. After aligning the jig, it's simply a matter of shifting the slide to bring the holes into position and tightening the bolts. Then drill each piece that gets a hole in that location, before sliding the stop to a new position.

To obtain full extension, three of the bolts must be removed, so it's critical the remaining bolt be securely fastened. PW

***Dana Martin Batory** is a writer and cabinetmaker who is particularly fascinated with reproducing Shaker furniture at one–twelfth scale. He also collects and restores antique woodworking equipment and is assisting in setting up the American Antique Power Tool Association and writing for its journal.*





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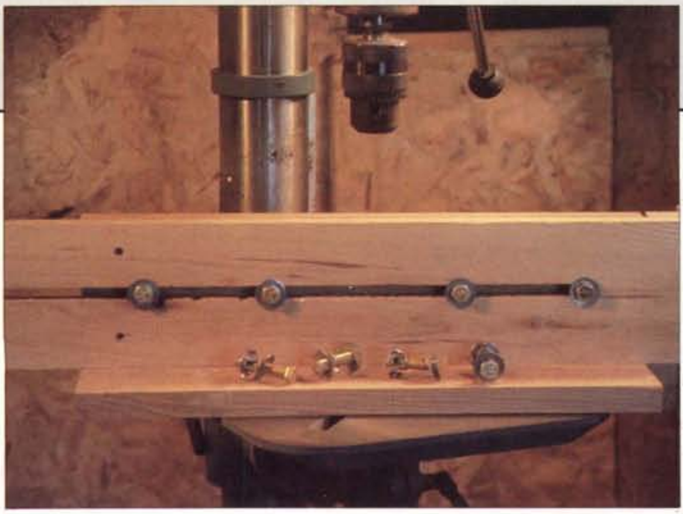


photos by the author

Drill Press Fence and Stop					
Cutting List					
		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
1	A	3/4"	4 1/2"	18"	fence
1	B	3/4"	4 1/2"	18"	base
1	C	3/4"	4 1/2"	36"	slide
1	D	3/4"	1 1/2"	5 1/4"	backrest
1	E	3/4"	1 1/2"	2 1/4"	bottomrest
1	F	3/8"	2 1/4"	6"	endstop
Supplies					
4	3/8" × 16 T–nuts				
4	3/8" × 16 × 1 1/2" bolts				
4	1" washers				
8	flat head wood screws				

A Popular Woodworking Project

How to Build a Marionette

by Bruce Taylor

String puppets have been widening eyes for over six centuries with their astonishingly lifelike movements. Since the first wooden actors hit the stage sometime in the middle ages, people have been asking puppeteers the same question: How is it done? Surely the puppeteers must spend years perfecting their technique. Well, the secret to how a puppet moves is how it is made. In other words, the real hero of the show is the dedicated woodworker—like old Gepetto—who builds the puppet and gives it the breath of life.

As it happens, the traditional jointed wooden marionette is not difficult to make. The following plans demonstrate how to use simple materials to construct a little wooden human in your own workshop.

photos and illustrations by the author

The Torso

Start with a block of softwood (I prefer clear pine) that is cut slightly larger than the torso you plan to make. For a 17" tall puppet a piece measuring 2-1/2" × 3-1/2" × 6" should suffice. Cut the block into two sections, corresponding to the trunk and the pelvis (see Figure 1).

Using a fine–toothed saw and a wood rasp, rough out the shape of the chest and shoulder segment, as in the illustration. There is lots of leeway here - just make sure the shoulders are wider than the waist so the arms hang properly.

Next, shape the pelvis as shown in Figure 2. The exact shape is not vitally important. What matters is that you end up with two flat, angled surfaces (A) to hang the legs from. The roughing out can be done entirely with a fine saw (I use a Japanese draw-blade saw). Round the corners with a wood rasp.

Now join the two body segments together, as in Figure 3, using four screw eyes. You will have to open the screw eyes with needlenose pliers and reclose them like the links of a chain. The rough shape of the torso is finished. Refine the shape and finish the surface as you like.

***Bruce Taylor** is a puppetmaker and performer with the Picardi Marionette Theatre, and the author of* Marionette Magic: From Concept to Curtain Call *which will be published in late 1988 by TAB Books Inc.*

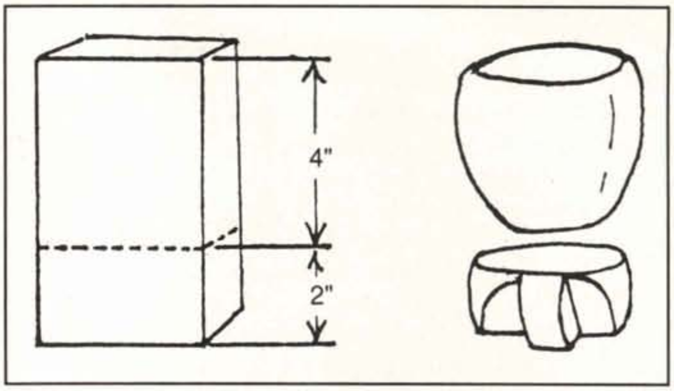
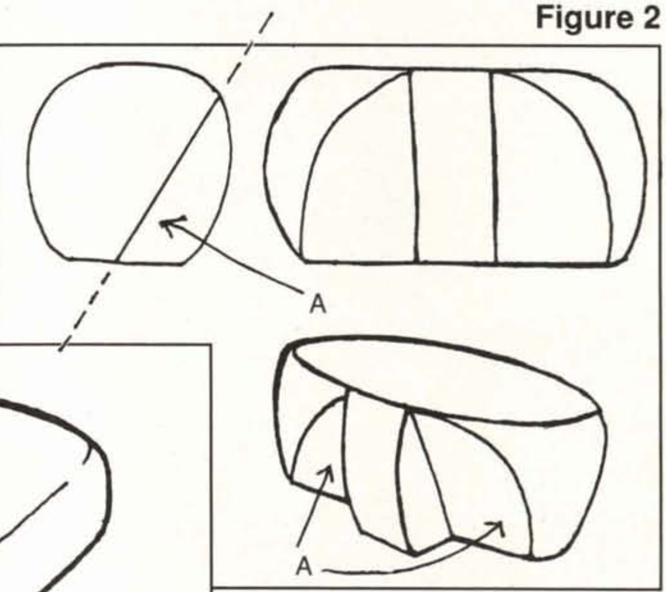


Figure 1

Figure 2



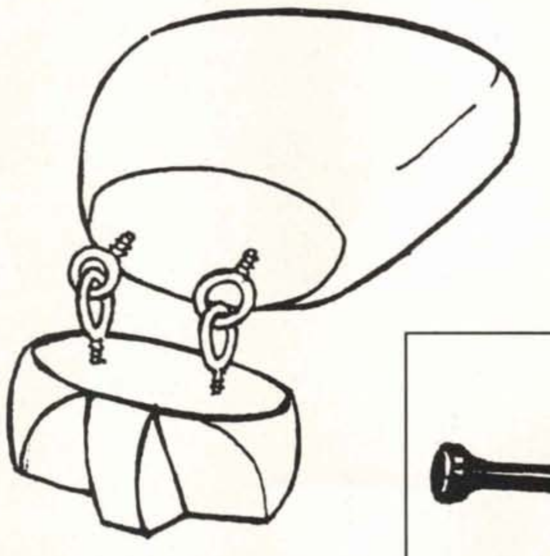
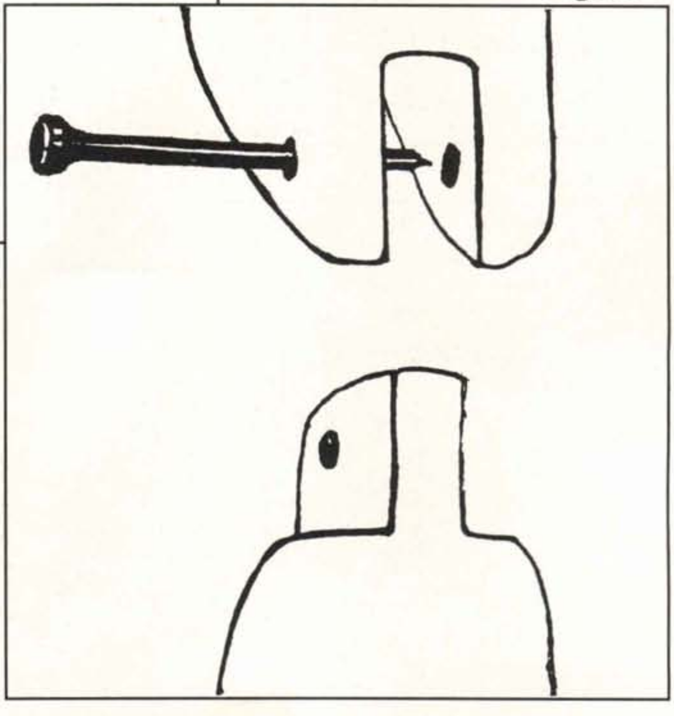


Figure 3

Figure 4



The Limbs

The legs are carved out of 3/4" or 1" hardwood doweling (I prefer maple). Cut four pieces, each roughly 4" long. The calf and thigh are notched together and hinged with a 3/4" finishing nail. Refer to the drawing of the completed leg assembly (Figure 9) and to Figure 4 for the shaping of the joint.

The notching is a delicate job and should be done with a fine saw and small chisel. The joint will probably need considerable fine-tuning with sandpaper. Examine it closely as you work and remove small pieces that obviously interfere with the smooth bending of the knee. The drilling of the hole for the finishing nail must be done with the thigh and calf notched together and clamped in place.

The feet can be pieced together out of any hardwood scraps you have around. Another option is to carve them from a single segment of doweling as in Figure 5. They are attached the same way as the knees, but remember: they must bend forward. Study Figure 6 (or your own foot) and you will see what I mean.

Finally, the pelvis and thighs are laced together with heavy string. First, drill holes in the pelvis and thigh, as shown in Figures 7 and 8. Tie the strings loose enough to allow the legs to bend.

Arms, you'll be glad to hear, are simpler than legs. Make them out of smaller doweling (1/2" to 3/4" should do). Elbow joints are identical to knee joints. No special joint is needed for the shoulder; it is attached, as the hips and pelvis are, with

Figure 5

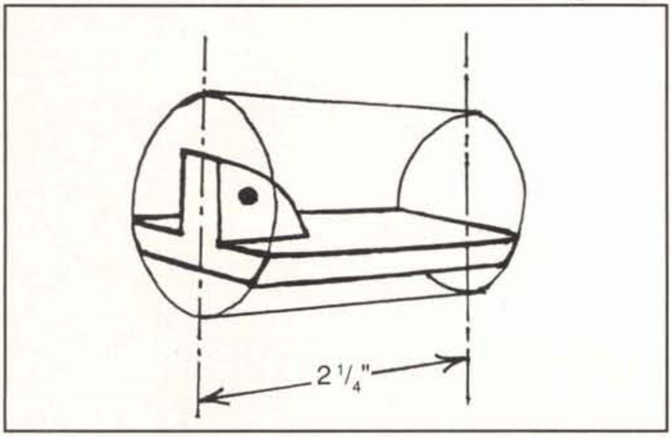


Figure 6

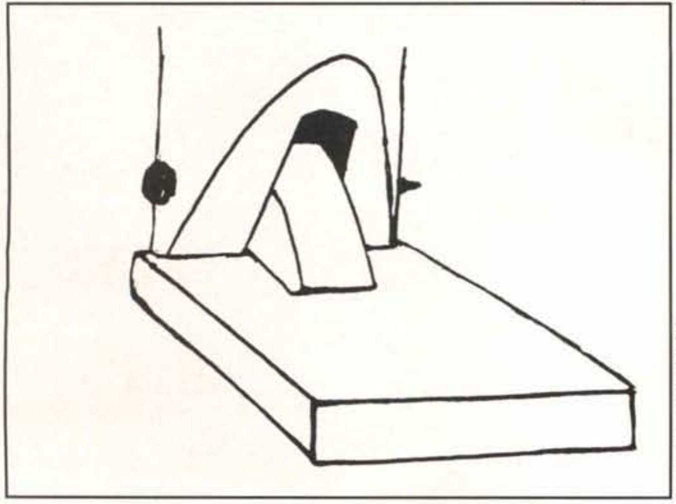
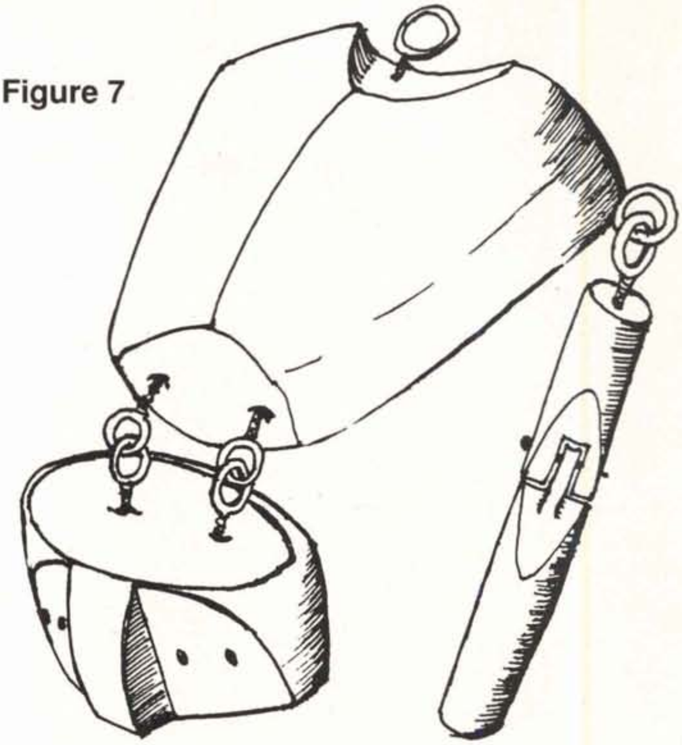
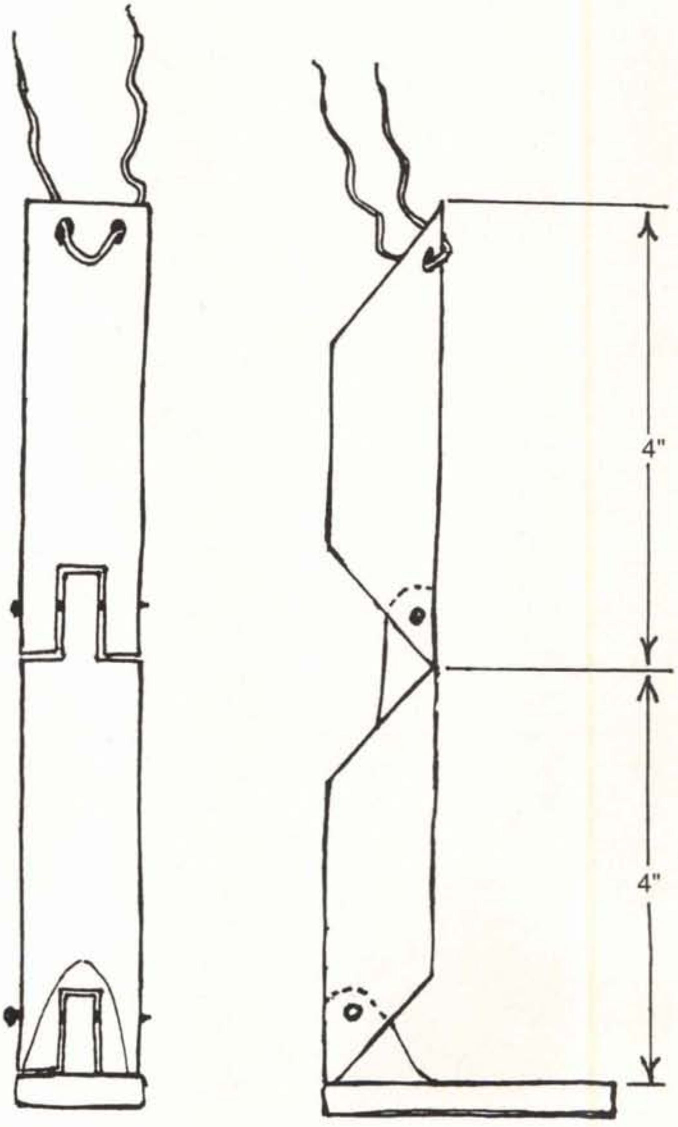


Figure 7





illustrations by the author

interlocking screw eyes.

With the body finished, it's time to attach the head and hands. These can be made out of papier mache over a wire frame, or—if you are ambitious—carved out of wood. You might wish to refer to William H. McMaster's recent series "Carving the Human Head" (*Popular Woodworking* Issues 28 thru 33). Hands should be joined rigidly to the arms. The head is mounted at the neck with two interlocking screw eyes.

Dress the puppet in loose and colorful clothes that won't hamper its movements. If you're not handy with a needle, clothes can be glued and tacked right to the puppet's body (marionettes, unlike dolls, are rarely undressed). You can hide the glue–seams with sequins, piping and cloth fringe.

String It Up!

A marionette control (or "airplane" as it's also known) can be as simple as two crossed slats of softwood with screw eyes to hang the strings from. Figure 9 shows a classic stringing arrangement. Experiment with different arrangements until you find one you like. Don't use household thread for the strings–it's weak and tangles easily. Black, woven fishing line (15 lb. test) is ideal.

The Toys that Bind

That about ties it up. Your puppet is finished—now what? Assuming you're not going to put on a puppet show, what do you do with your finished marionette? The answer is obvious: give it to a child. Almost without exception, kids are natural puppeteers. I've taught workshops where the children have concocted a script, built puppets and performed a whole show all in one day. Now, I know what some readers are thinking. Little Elmo already has a marionette—right now it's lying in a permanent tangle at the bottom of his toybox. Well, the reason Elmo never plays with his puppet is not that he lacks the motor skills, and it's not that he'd really rather "master the universe" with his Mr. Thug doll. Chances are the puppet is just badly made. Its legs twist, its strings are not long enough, it can't turn its head—in short, it's a dead loss. This is one toy that money just can't buy. But build one that works, and your little ones are sure to develop close ties with it! **PW**

Figure 9

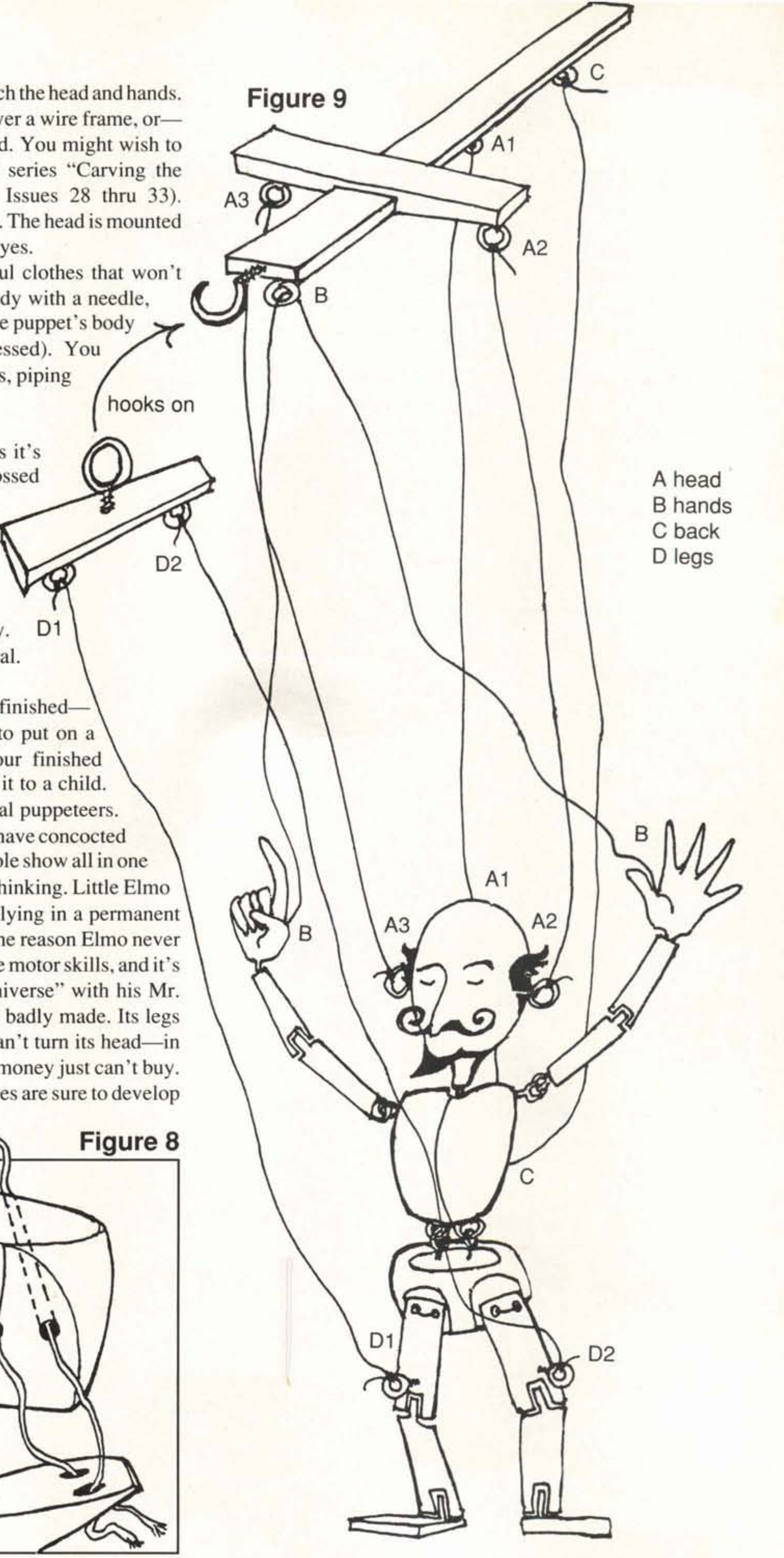
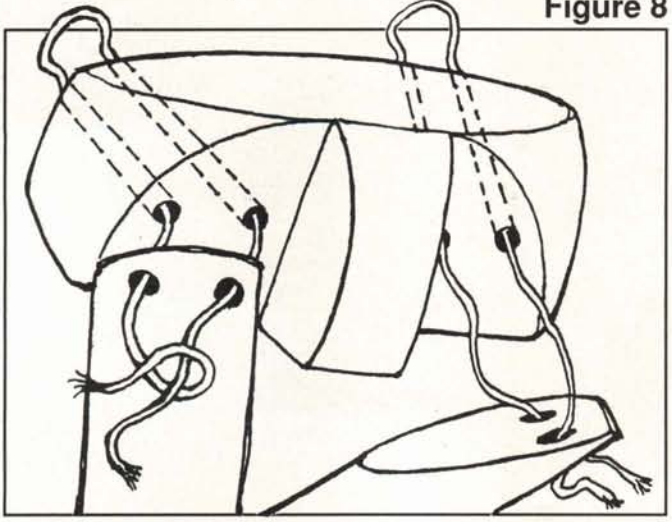


Figure 8



A Popular Woodworking Project

For the Baby and Beyond
A Chest of Drawers Designed with Growing Up in Mind

by S. Reed Poverny

This mahogany chest of drawers blends traditional lines with a modern day idea. The top is a dressing table for changing a baby's diapers. Down below are convenient storage drawers. When diapers are outgrown, a miniature chest of drawers stands ready for a child's use. Later, the piece can serve the next generation.

Interpreting an Early American design, craftsman Hugo van der Horst built the chest using post and panel construction. Subtle details like tapered legs and moulded edges give the sturdy structure a light and delicate feeling. These plans differ slightly from the piece in the photos in that the floating panel above the top drawer is now a one-piece apron.

The legs or "posts" (A) are perhaps the most critical members in the project. Nearly all the horizontal members relate to them in some way (see Figure 1). The easiest and most accurate way to lay out these pieces is

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***S. Reed Poverny** is a contributing editor to* PW.

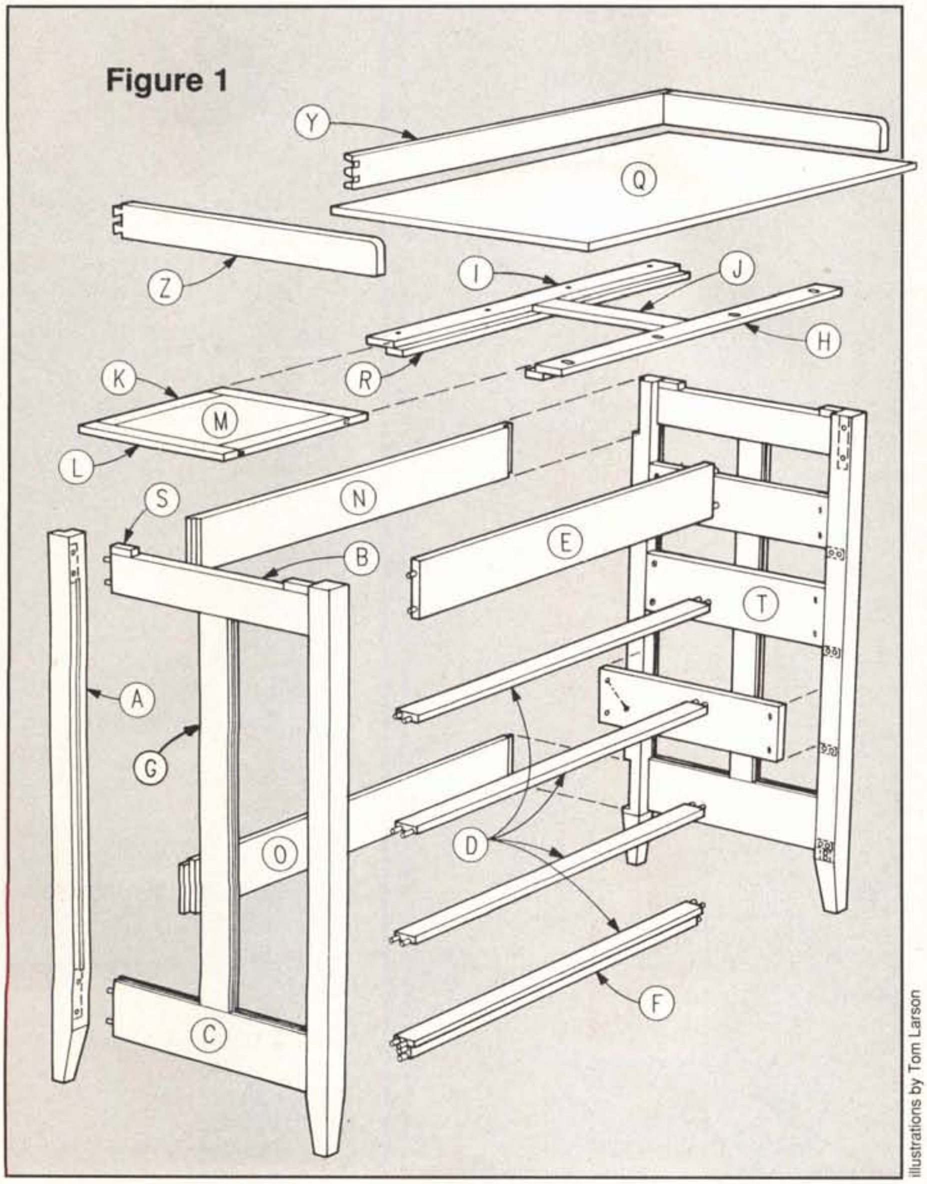
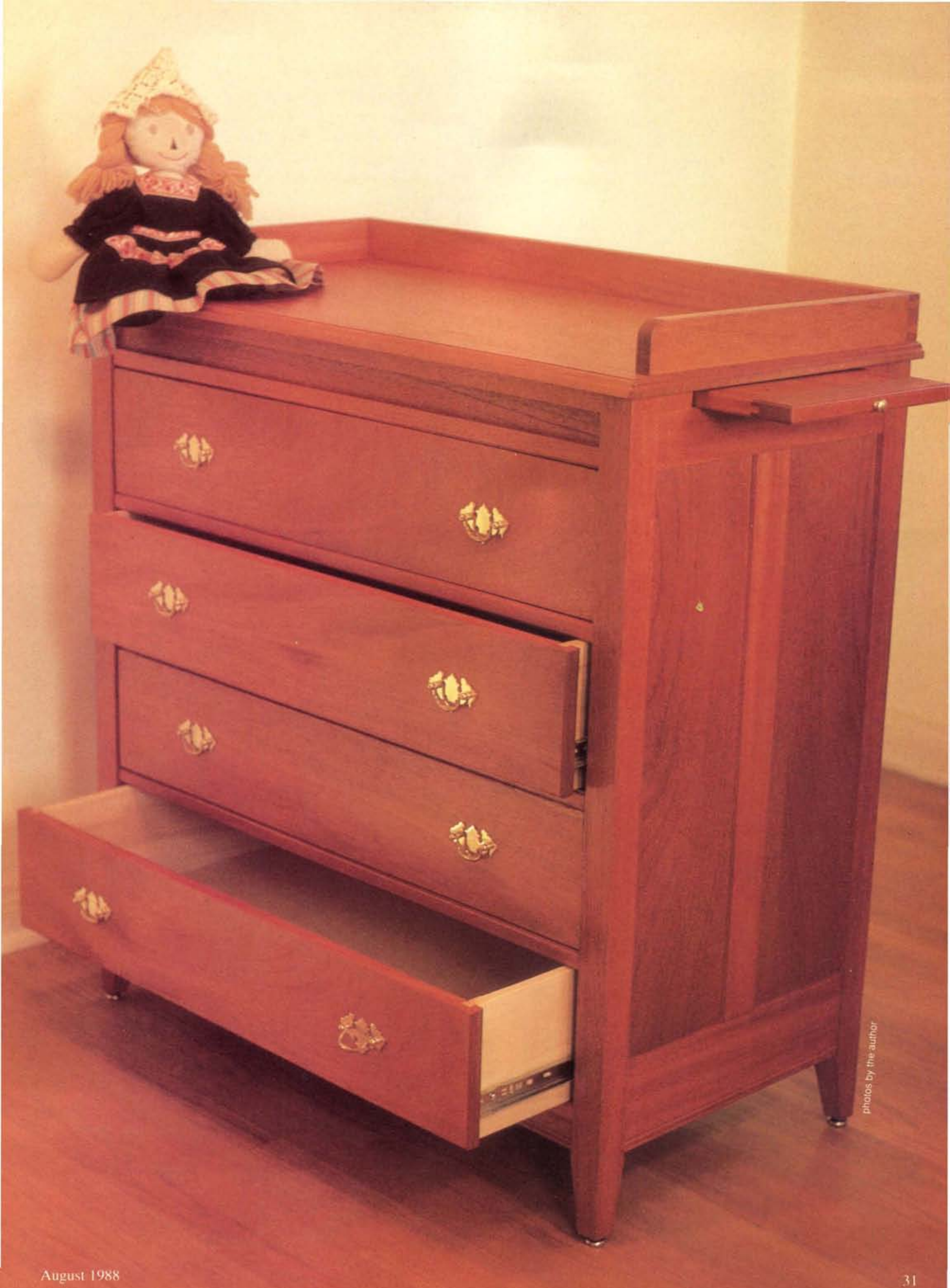


Figure 1

illustrations by Tom Larson

Baby's Dresser					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
4	A	1 1/2"	1 1/2"	34 3/4"	posts
2	B	3/4"	2 1/4"	14"	top side rails
2	C	3/4"	4"	14"	bottom side rails
4	D	3/4"	1 3/8"	30 1/2"	front rails
1	E	3/4"	3"	30 1/2"	apron
1	F	3/4"	1 1/4"	30 1/2"	bottom front rail
2	G	3/4"	2"	25"	mullions
1	H	3/4"	2 5/8"	31 1/8"	H–frame front
1	I	3/4"	2 1/8"	31 1/8"	H–frame back
1	J	3/4"	2"	12"	H–frame crosspiece
4	K	3/4"	2"	12 3/4"	leaf frame sides
4	L	3/4"	2"	10 7/8"	leaf frame ends
2	M	3/4"	7 1/2"	12 5/8"	leaf panels
1	N	3/4"	3 1/2"	31 1/4"	top back rail
1	O	3/4"	4"	31 1/4"	bottom back rail
4	P	1/2"	6 5/8"	24 7/8"	side panels
1	Q	3/4"	18"	35 1/2"	top
2	R	3/4"	1 1/2"	31 1/8"	leaf runners
4	S	3/4"	3/4"	1 1/2"	filler blocks
8	T	3/4"	4"	14"	drawer rails
4	U	3/4"	5 7/8"	30 1/4"	drawer fronts
8	V	3/4"	5 7/8"	14 3/8"	drawer sides
4	W	3/4"	5 1/8"	28 3/4"	drawer backs
4	X	1/4"	14 1/4"	28 3/4"	drawer bottoms
1	Y	3/4"	2"	31 5/8"	back guard rail
2	Z	3/4"	2"	14"	side guard rails
1	AA	1/4"	31 1/4"	25 1/2"	back


photos by the author

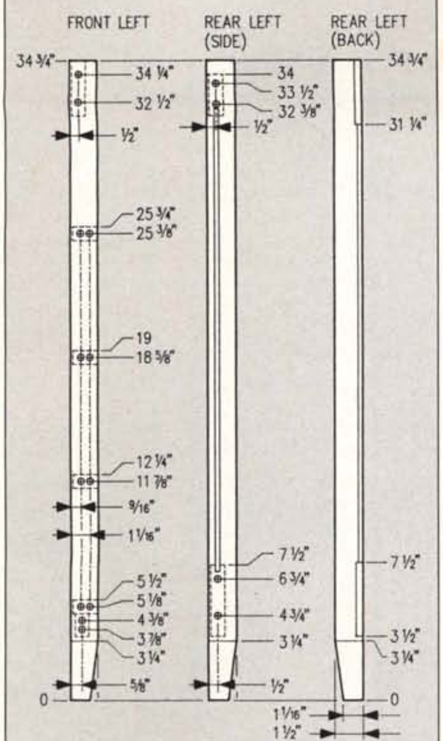


Figure 2

to make a story pole.

Telling a Story

Choose a straight, square, and parallel piece of scrap wood that is at least 2" wide and slightly longer than the finished length of the posts to use for your story pole. Identify the best end as the bottom, and, taking all your measurements from this end, mark out the locations of the horizontal members according to the dimensions shown in Figure 2. Use one edge of one face for marking the dimensions of the front rails and the other edge for the side rails. On the back face of your story pole, mark the locations for the back rails.

Now cut the posts to size, but don't cut the tapers until after you've laid out and bored all the holes and completed any other machining. Mark all four sides of each piece in terms of its position in the cabinet (e.g., front, left, inside surface, etc.), then transfer the layout lines from your story pole to the appropriate surface on each post. No two posts will be laid out the same, so take your time and think it all the way through.

Once the dowel locations are laid out on the posts, carefully lay out corresponding holes on the ends of the side rails (B and C), front rails (D), apron (E), and bottom front rail (F). Next, locate the centers of the side rails (B and C) and mark dowel holes at 1/2" to each side of center for the mullions (G).

You might as well do all your doweling simultaneously, so cut the top H–frame members (H, I, and J) to size and lay out their dowel holes as indicated in Figure 3.

When all the holes are drilled, set up your router with a 1/4" straight bit, set to a depth of 3/8". Use it to rout channels down the center of the inside edges of the side rails and both edges of each mullion. A router table with a fence is the best way to do this. With the fence set up 1/4" away from the bit, just reference the outside face of each piece (including the posts) against it. To make the stopped grooves in the posts, mark starting and stopping points on the fence (as shown in Figure 4). Be sure to orient each piece according to its position in the cabinet; you'll need two

Brass hardware, moulded edges and a dovetailed guard rail detail the dresser.

photos by the author

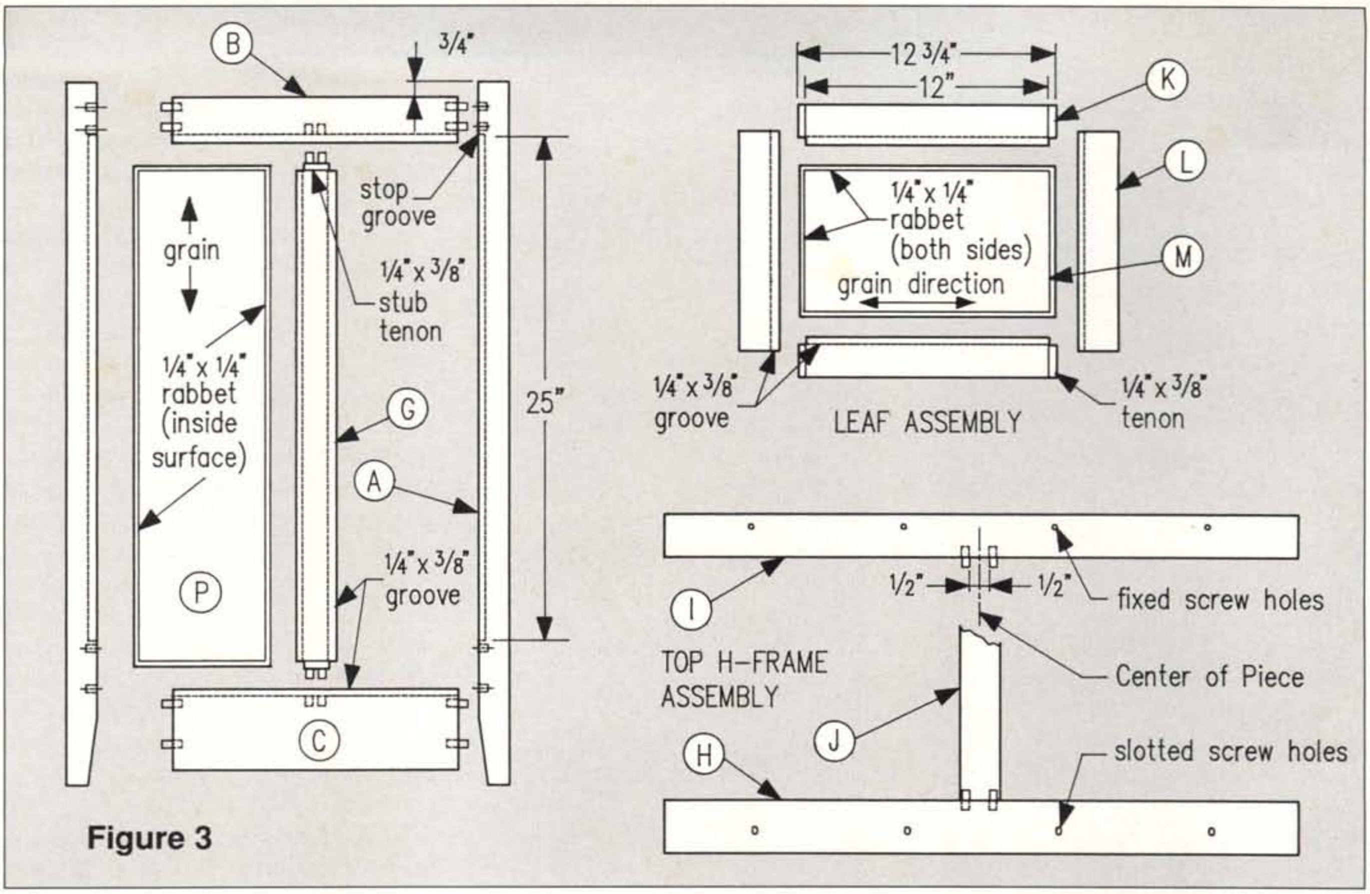


Figure 3

sets of starting and stopping marks on the fence.

Use this same router setup to cut the grooves in the leaf frame pieces (K and L) to accept the panel (M).

Next, move the fence up flush to the edge of the bit to cut a 3/8" wide × 1/4" deep, stopped rabbet along the back inside edge of the two back posts and the two back rails (N and O). Then rout a 3/8" rabbet on the posts (as in Figure 2) to accept the back rails. Cut the same size rabbet across the ends of the back rails to fit into the rabbet in the posts.

Glue up solid stock to make the leaf panels (M), side panels (P), and the top (Q). Choose the best face of the leaf and side panels, and rout a 1/4" × 1/4" rabbet around the edges of that face to create the tongue which fits into the frame. Round the two front corners of the top (Q) to a 3/8" diameter, then use a 3/8" roman ogee router bit to shape the three front edges. Hugo also uses a 1/8" round–over bit (set 1/16" deeper to create a step detail) to trim the front edges of the front rails (D) and the bottom edge of the apron (E).

Assembly

Dry fit everything, then begin assembly by putting together the front

illustrations by Tom Larson

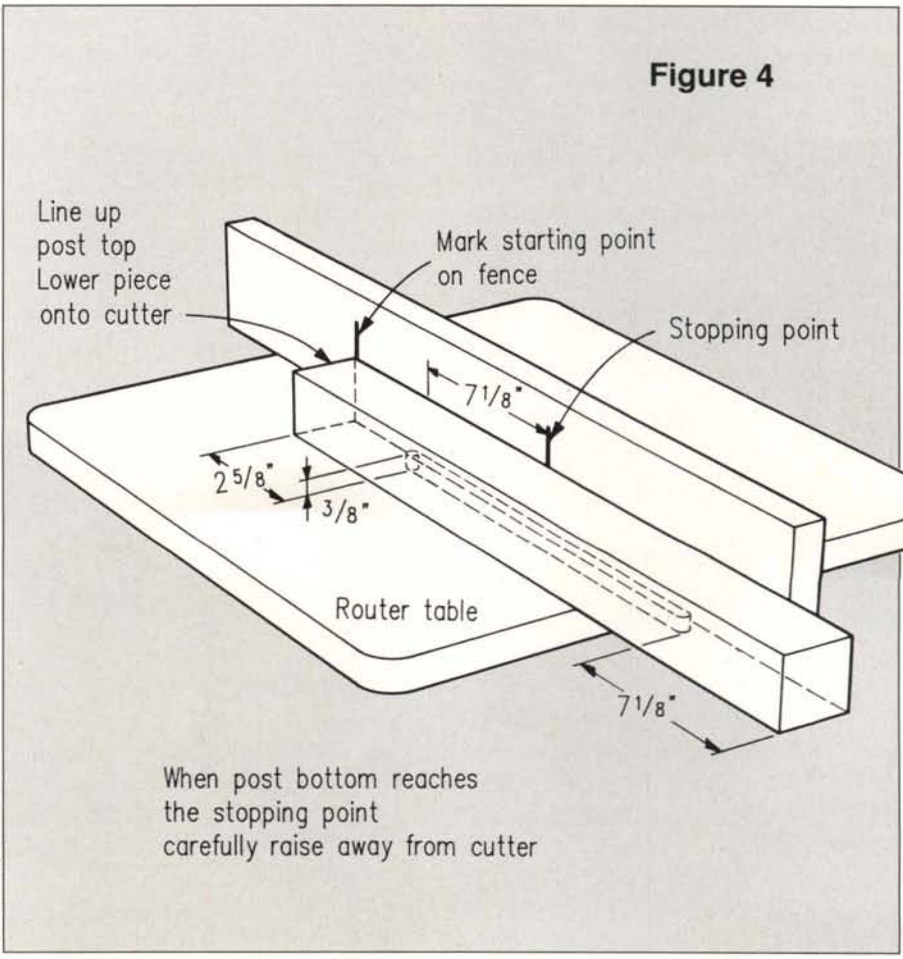
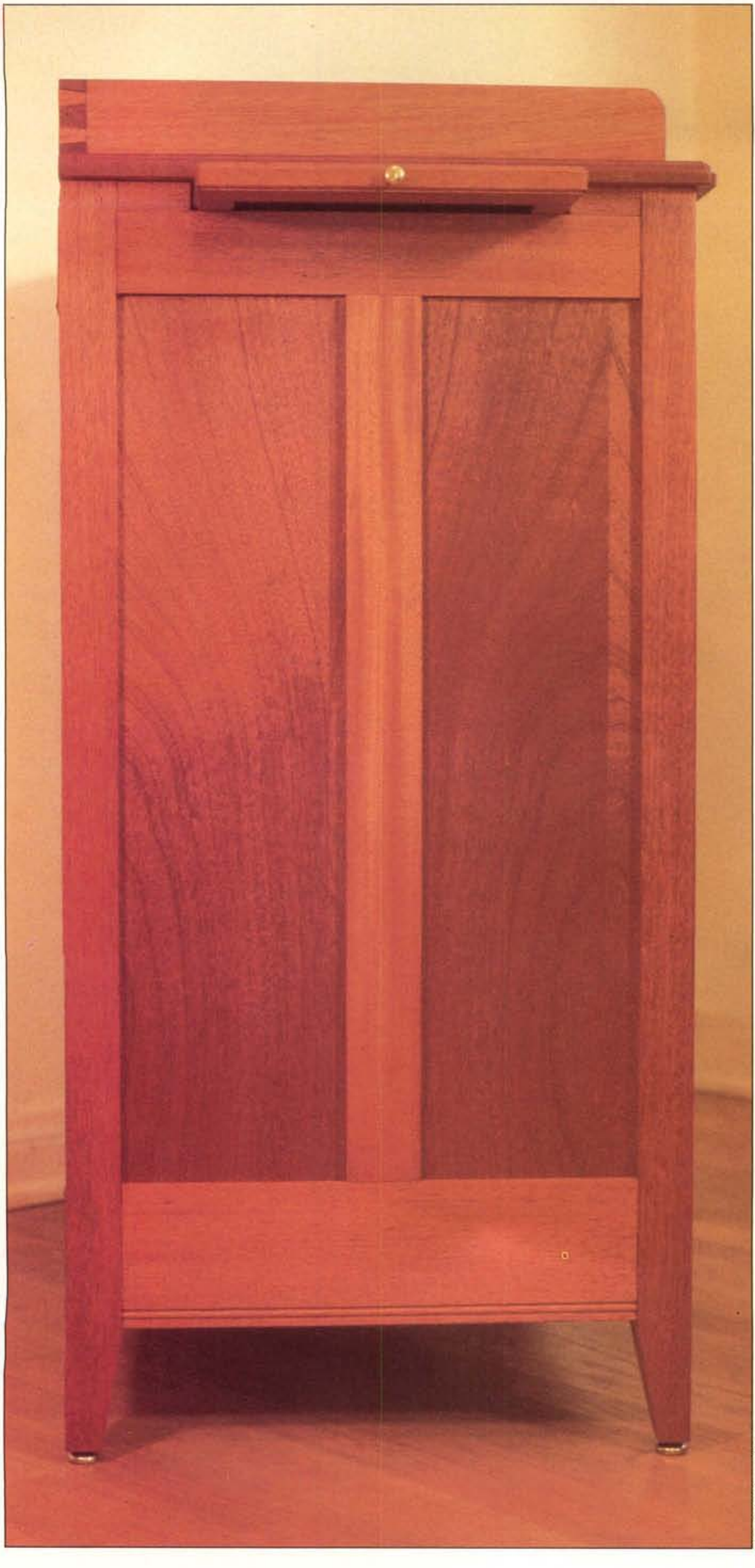


Figure 4

Line up post top Lower piece onto cutter
Mark starting point on fence
Stopping point
7 1/8"
2 5/8"
3/8"
Router table
7 1/8"

When post bottom reaches the stopping point carefully raise away from cutter



photos by the author

rails (D, E, and F) and posts. Glue the dowels into the ends of the rails first, then insert them into the two front posts and clamp this assembly, checking the drawer openings for square. Next, put together the side H–assemblies *(B, C, and G)* and the top H–frame (H, I, and J).

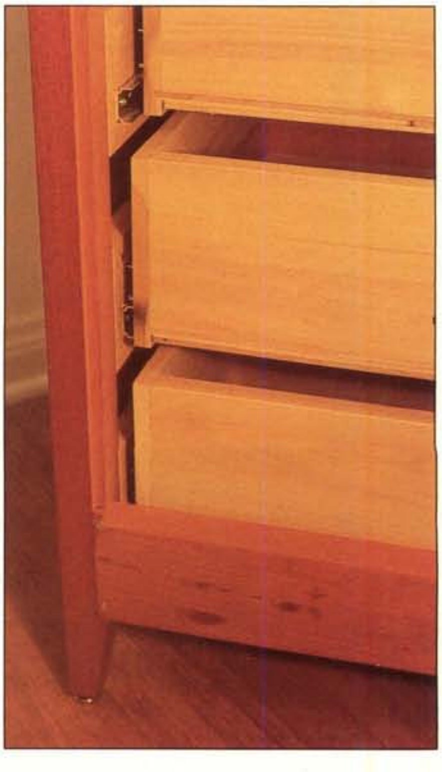
The leaf panels (M) and side panels (P) should be completely sanded and finished before they are installed. They should float freely within their frames to allow for expansion and contraction, so don't get any glue on their edges or in the grooves they fit into. Fit the side panels into the H–assemblies, add the back posts, then apply the front assembly. Glue and screw the back rails (N and O) into their rabbets in the back posts.

When the top H–frame assembly is dry, apply the leaf runners (R) to the underside of the front and back members (H and I) to provide support for the leaves to slide on (see Figure 5). Attach the filler blocks (S) to the top side rails (B) to form the opening for the leaves.

Drawers

Before attaching the top or the back, install the drawer rails (T) by pocket–screwing them flush to the inside edges of the posts. Screw your metal

Pocket–screw the drawer rails between the posts, and attach your drawer slide hardware to the rails. Rabbet the posts and the back rails to accept the back.



drawer guides directly to these rails. Study the manufacturers' instructions to determine their proper positioning.

Cut the drawer fronts (U), sides (V), backs (W), and bottoms (X) to size according to the cutting list. (Make sure these dimensions will work with the type of drawer guides you use.) With a dovetail router bit set up in your router table, cut sliding dovetail mortises centered 3/4" from each end on the backs of the drawer fronts (U). Cut corresponding dovetail tenons on the front end of each drawer side (V). At the other end of the drawer sides cut a 3/8" wide × 1/4" deep dado 3/8" from the end to accept the tongue of a 3/8" × 3/8" rabbet on the ends of the drawer backs (W). Cut a 1/4" × 1/4" groove 5-1/8" from the top edge of the drawer sides and fronts to accept the bottoms (X) (see Figure 6). Be sure to stop this bottom groove when it enters the sliding dovetail mortise in the drawer fronts.

For final detailing on the drawer fronts, chamfer the back edges as shown in Figure 6, and use a 1/8" round–over bit to trim the front edges. Assemble the drawer, then slide the bottom into its groove and drive a screw through it and into the drawer back.

Final Assembly

Once the drawer guides are all properly adjusted, install the top H-frame to the cabinet by gluing it to the inside surface of the apron (E) and the top back rail (N).

Cut the guard rails (Y and Z) to size and assemble them with through dovetails as shown in the photos, or make the back guard rail (Y) 1-1/2" shorter than the cutting list suggests, and simply dowel it between the two side guard rails (Z). Clamp this guard rail assembly to the top and drive countersunk screws up through the top and into the back guard rail. Drive screws into the side guard rails too, but enlarge those holes *in the top* to allow for cross grain movement.

With the top upside down, position the chest upside down on top of it. Clamp it in place and drill screw holes through the H–frame and into the top. Make slotted screw holes in the H–frame front (H) and use round head screws with washers to allow for wood movement. The screws through the H–frame back (I) can be fixed securely.

Final Touches

Almost fully assembled, except for the back (AA), the chest is ready for finishing. Hugo prefers the durability of polymerized tung oil; he applies four coats of the finish, sanding lightly between coats. Fit the back into its rabbet and glue and screw it in place. Apply the drawer pulls of your choice and put 3/4" diameter furniture glides on the bottom of each post. Finally, apply a coat of beeswax to the completed chest to give it a high shine. **PW**

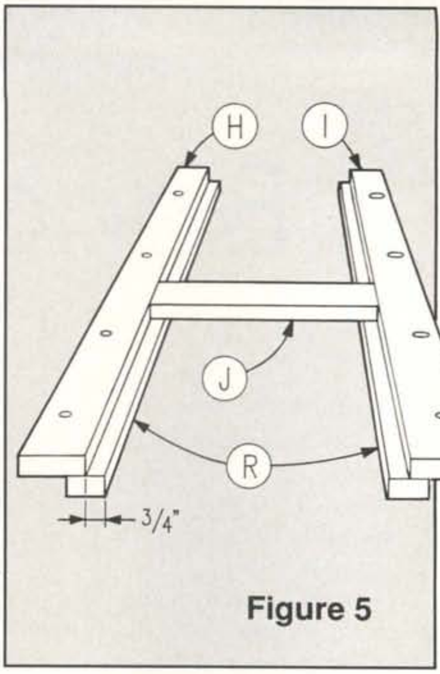


Figure 5

Illustrations by Tom Larson

Supplies	
4	pair drawer slides
8	drawer pulls
4	3/4" furniture glides
	3/8" fluted dowels
	#6 flat head wood screws
	#6 round head wood screws
	washers

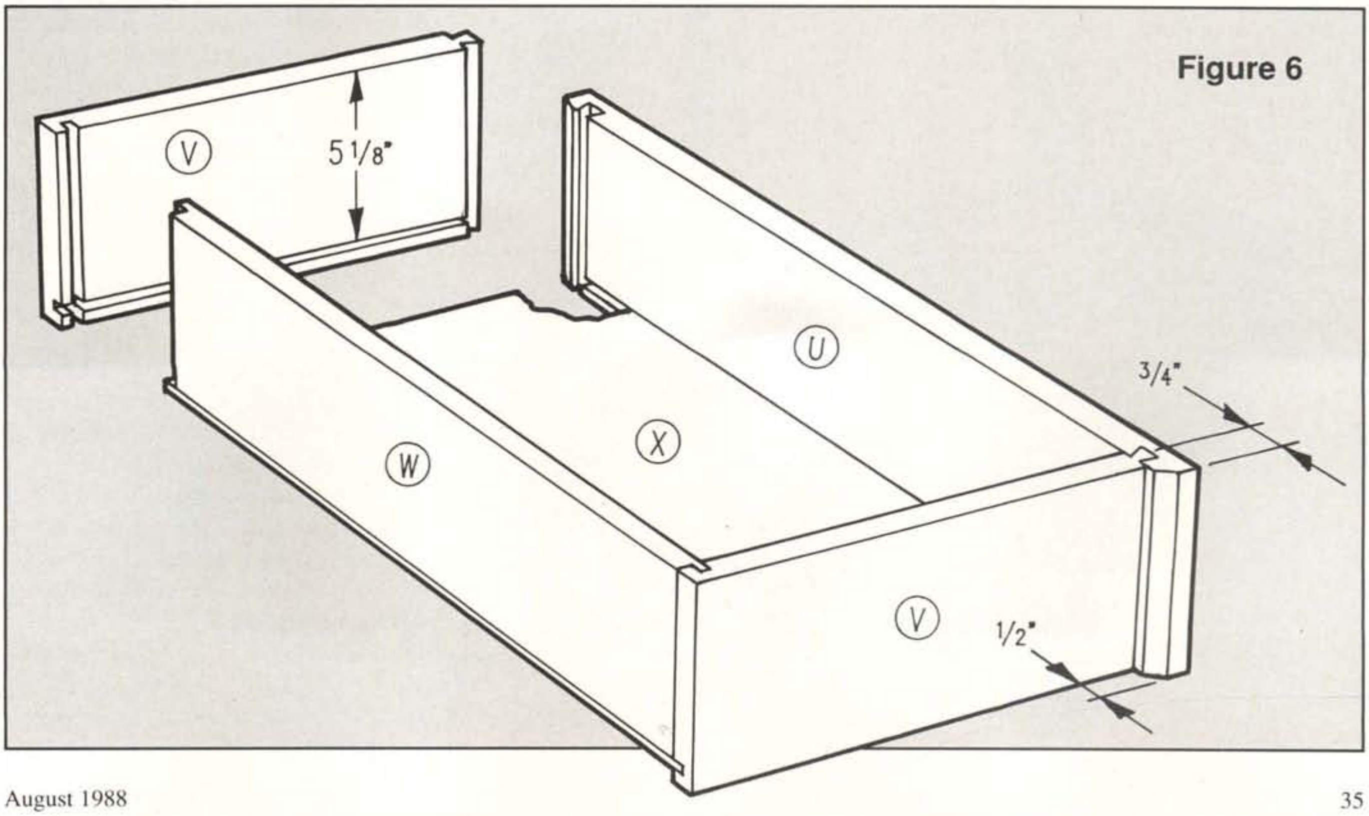


Figure 6

A Popular Woodworking Project

Bandsawn Basket

by John A. Nelson

Baskets come in all shapes and sizes, and they are made of many different materials. This one is truly unique–it collapses flat for storing and is quite a conversation piece.

Choose a straight–grained, knot–free piece of hardwood that's about 3/4" × 7" × 13". Sand the top and bottom surfaces.

Start by laying out the pattern. Draw a straight line horizontally across the middle of a large piece of paper, and another line at the center of the first running 90° to it. Where the two lines intersect; measure 3" in both directions along the horizontal line and make a small dash line. The left dash indicates the left swing point for the compass. From the right dash line, measure down exactly 1/8"—this will be the right swing point for the compass.

Using a good compass, and starting from the left swing point, swing a 1-1/4" radius arc. Keep swinging larger and larger arcs at 1/4" increments until you reach 3-1/4". From the right swing point, start with a 1-3/8" radius arc and stop at 3-1/8". Take your time; this must be as accurate as possible to insure a proper fitting basket. The last arc, which is the handle, is 5/16" wide, not 1/4" as are all the other arcs. Carefully, draw straight lines connecting the arcs on the right and left ends as shown in the top view. Shade in the 5/16" wide handle so you will remember where it is.

Measure 3/8" to either side of the vertical center line. This indicates the location of the base. Your drawing should look exactly like the top view of the basket illustrated.

Using rubber cement, coat the back side of the paper and let the glue dry completely. Wipe the surface of the wood to remove all dust and attach the pattern to the top surface of the board.

Transfer the two lines for the base piece to the bottom surface of the basket —be sure to keep it directly below the two lines above. Bandsaw the outer surface of the basket, keeping just outside the line. Sand down to the line, keeping all edges square. Locate and drill the two 1/16" diameter holes centered along the outer edge of basket, and between the two lines that indicate the base. Make one hole 3/4" deep where the 3/4" long tack will be located, and on the opposite edge, drill the second hole 1/2" deep to accept a 1/2" long tack (see illustration).

Cut the inside surface of the handle to separate it from the rest of the basket. Sand the outer surface, again keeping all edges square.

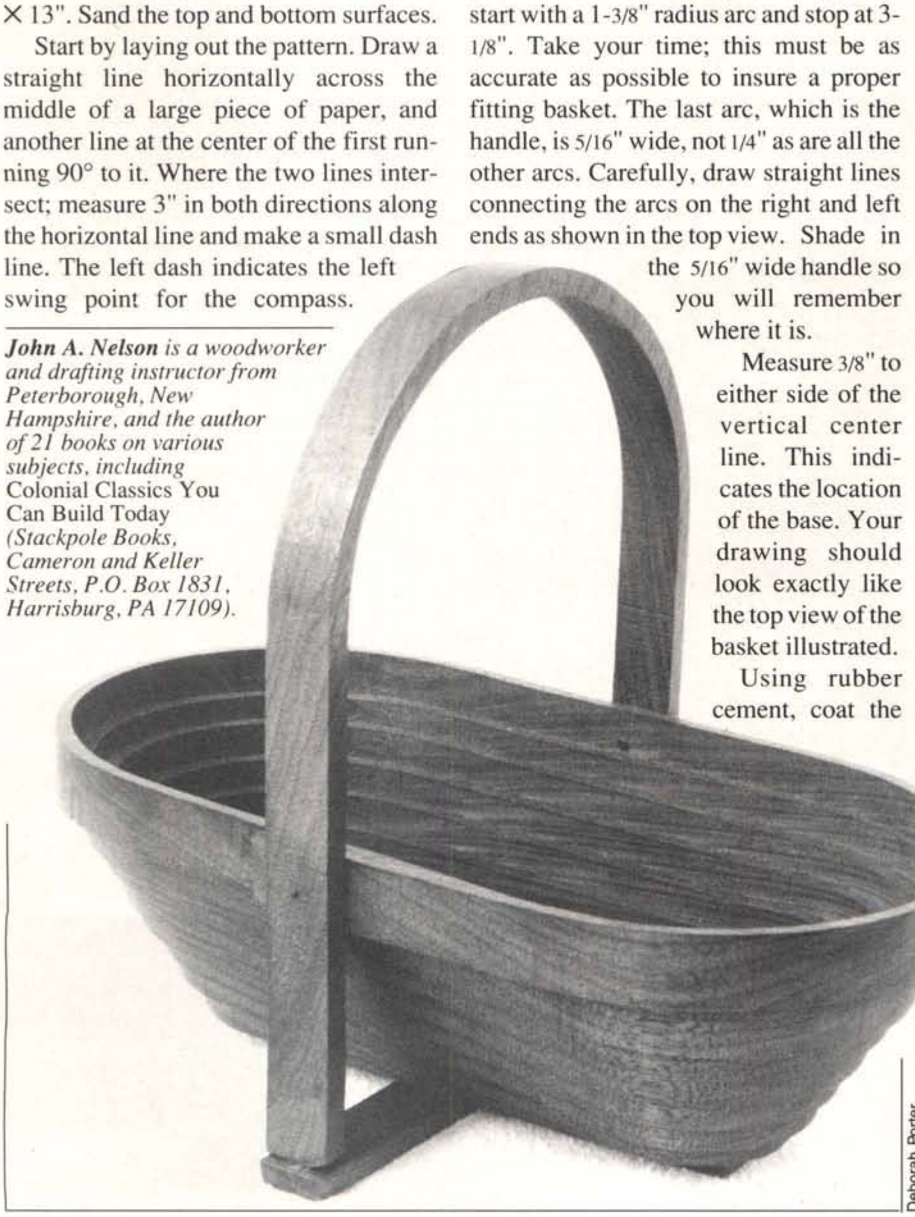
Adjust the band saw table to 6° and starting from the largest outer arc, cut around the basket keeping on the line all the way around. Cut until you get to the area marked, "stop cut." Shut off the band saw and carefully back your way out.

Turn the basket over and glue the base piece in place. Take care to glue it exactly across the center as shown. Locate and glue the two 3/4" × 3/4" feet in place.

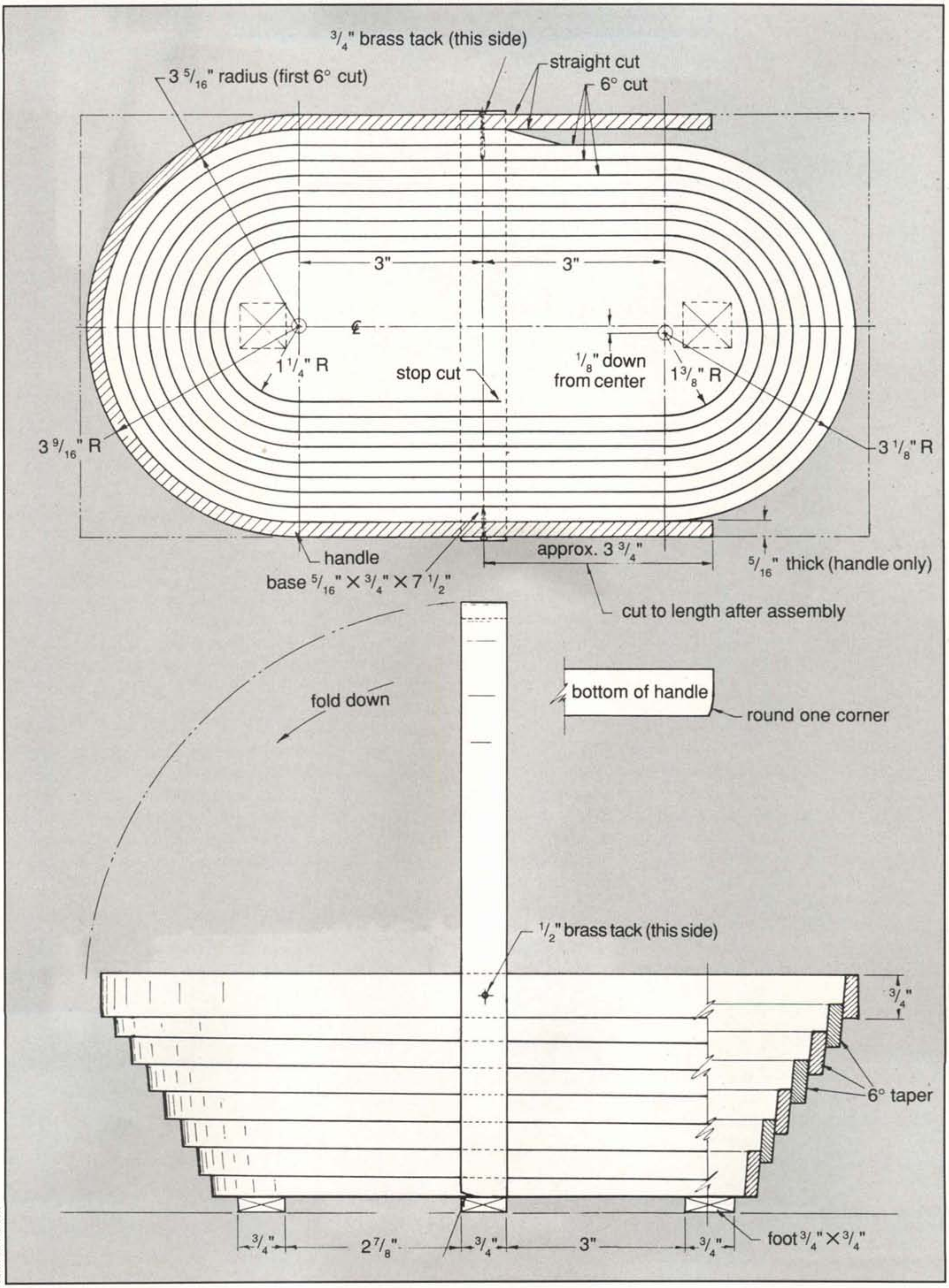
Temporarily add the handle with two finish nails. Pull the basket up into shape and check the length of the handle ends. The ends should be trimmed so the basket is extended to its highest possible position. That way, the handle will lock the basket in the open position. Round one corner of the handle at each end so it will snap into place easier. Sand all over, and the basket is ready to finish.

Install a tight–fitting 3/4" long brass tack to one side of the handle and a 1/2" long brass tack to the other side. Check for a good tight fit. **PW**

John A. Nelson is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of 21 books on various subjects, including Colonial Classics You Can Build Today *(Stackpole Books, Cameron and Keller Streets, P.O. Box 1831, Harrisburg, PA 17109).*



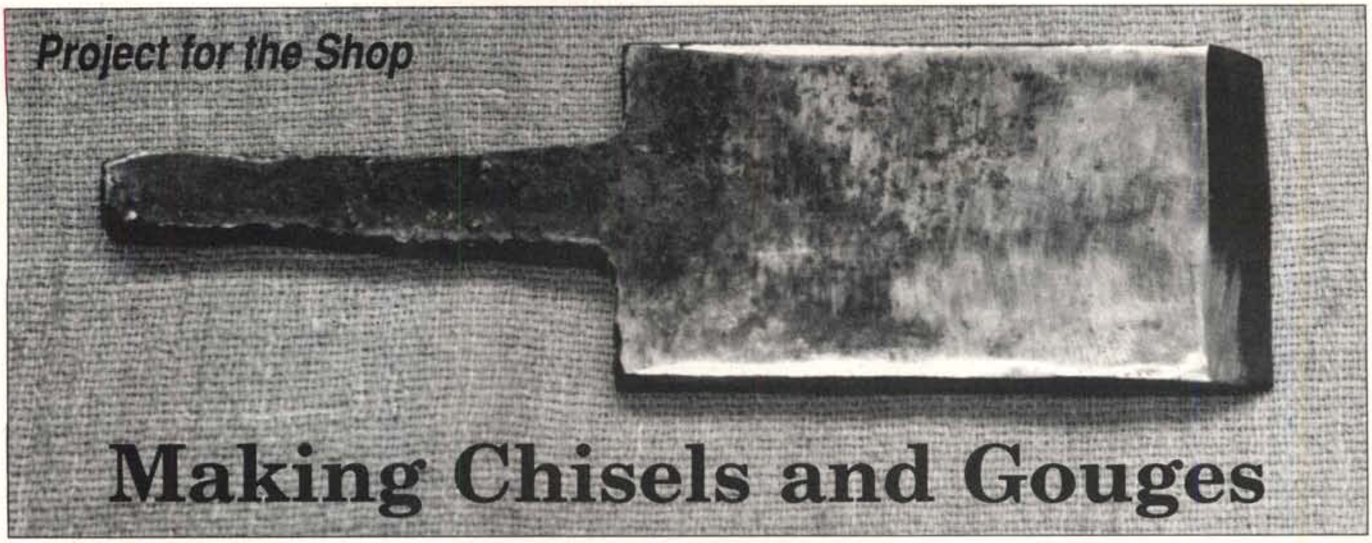
Deborah Porter



John A. Nelson

Project for the Shop

Making Chisels and Gouges



by M. M. Lishinsky

Making your own furniture is a sign that you're a practical craftsman. How about taking it a step further by making your own *tools* for making your furniture? The process for making chisels and gouges isn't as intimidating as it might seem. Two propane torches will do anything a coal forge can do, so you won't need expensive special equipment.

To begin with, let's talk about steel. The important ingredient in steel is carbon. More carbon in the steel means a longer edge life and a better ability to accept heat treatment. Low–carbon steel is used for any item that does not need to have a durable edge.

High–carbon steel is catagorized by the percentage of carbon ranging from .50% (1/2 of 1%) to 1.25%. The ideal steel for fine woodworking tools is around .75% to .95%. Commercially available W–1 tool steel (drill rod @ .95% carbon) is excellent for this purpose. I buy my steel from Pacific Machinery and Tool Steel (see "For More Information" on page 40). They can supply many sizes of flat and square stock of W–1 through the mail.

For most chisels you'll want material that is 1/8" to 1/4" thick. The width, of course, depends on the size of tool you want. Firmer chisels for rough work should be fairly stout, while paring chisels don't need much thickness. Square stock is ideal for mortise chisels.

***Michael M. Lishinsky** is a master toolsmith and proprietor of Wildfire Tool Co. in Williams, Oregon. He also teaches through Portland State University Independent Study Program and offers apprenticeships at his shop.*

An excellent alternative to buying new tool steel would be to use an old leaf spring from an automobile. This is what I used in the demonstration photos. When it comes to using leaf springs for this type of project, older is better—with pre–World War II leaf springs being the best. This is because alloys were developed and added after WW II that makes it somewhat more difficult to harden and temper the steel.

Heat Treating

When steel is worked, it gets a certain amount of uneven tension in it. This creates stresses and may cause the billet to crack. To get this tension out of the steel, it needs to be relaxed or **annealed**. Annealing is done by heating the billet to its **critical temperature** of 1450° Fahrenheit and then allowing it to cool slowly in a bucket of wood ashes or air-slaked lime. This brings the steel to its softest state so it can be worked without harm.

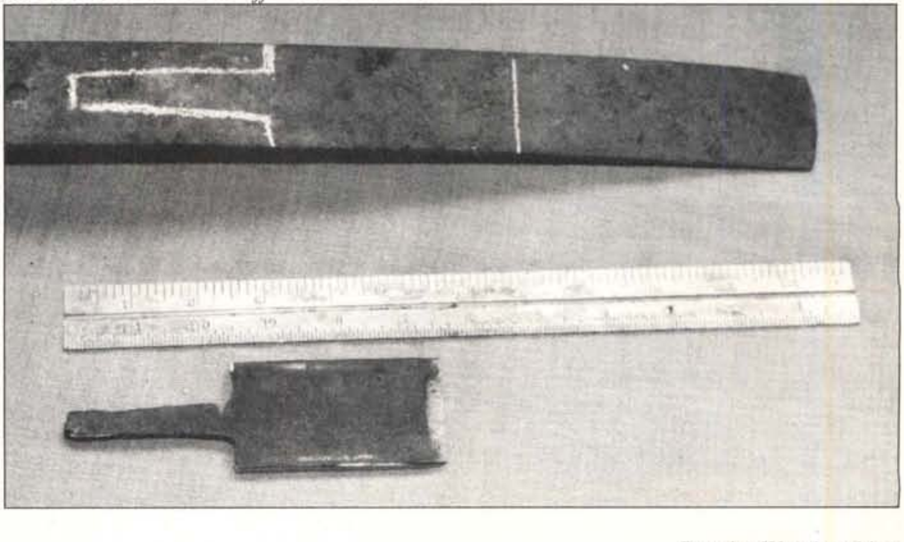
After working the steel, it is necessary to **harden** it. The billet is heated to 1450° and then cooled *quickly* by quenching it in 10–weight oil (vegetable oil will also work). The way to tell that you have reached the critical temperature is to touch a cow magnet to the steel as it approaches a cherry red heat. At exactly the point that the steel reaches 1450°, the magnet will no longer be attracted to it.

After hardening, the tool will be full of tension, so it needs to be **tempered** back from its total hardness to the proper hardness desired for the use of the tool.

Grinding

Whether you're using leaf springs or new steel from a jobber, it will be in an annealed condition—soft and ready to grind. Cut your billet from the leaf spring with a torch, or better yet, a cut–off wheel. If you use a torch, leave an extra 1/4" to 3/8" all around and then grind it back.

An auto leaf spring can be a good source of tool steel. Mark the shape with chalk and cut it out with an abrasive cut–off wheel or a torch.



photos by the author

Be sure to read all information pertaining to the speed of your grinding wheel, as well as any books dealing with grinding in general, so that you're well-versed in safe grinding practices. I ground the nail off my index finger in a split second because I was careless. Be sure to hold the workpiece with a pair of pliers, wear safety goggles, and watch out for long hair and loose clothing. I even wear ear plugs and a face mask.

Be sure to quench the tool frequently as you grind to prevent accidentally drawing the colors, as when a piece of steel turns blue from getting too hot. If the steel does turn blue while grinding, you should anneal it, and start again.

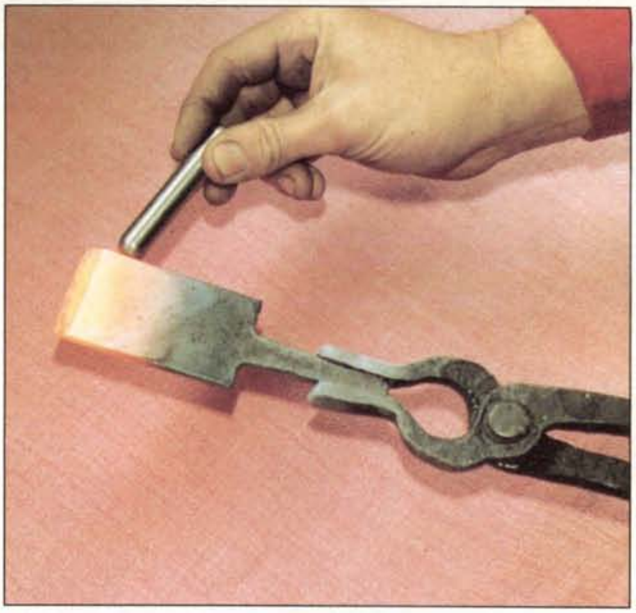
I use a double-reinforced snag wheel to remove a lot of material quickly. It's rated at 16–grit and casters use it to clean rough–cast items. However, any grinding wheel will do.

For a tool that will be struck, shape the billet with a 3" or 4" long blade and a 2" to 3" tang. Hand–held detailing tools can be an inch or so shorter. Use a file to finish up the area where the tang meets the body of the tool.

To make a gouge, slice a lengthwise section of pipe that is the appropriate diameter and clamp it in a vise. Heat your billet to no more than a light yellow heat and use a ball peen hammer to shape it down into the concave section of pipe. Don't get the steel too hot, because if it sparks at a white heat, it's ruined.

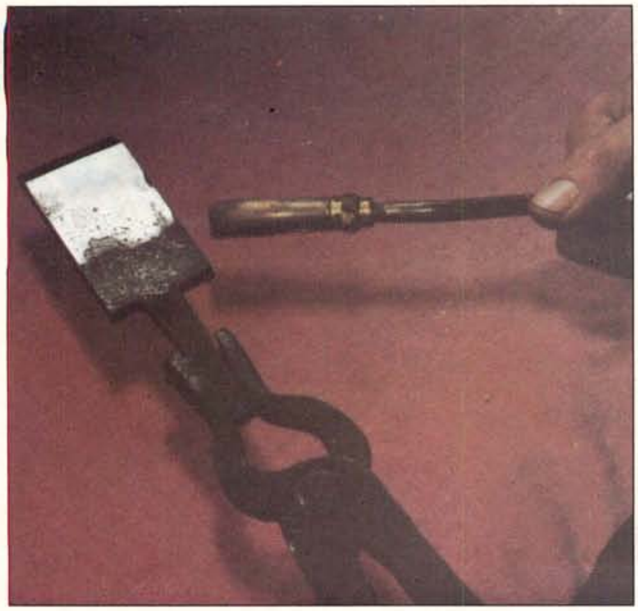
After shaping the tool, grind a bevel that suits the purpose of the tool and the kind of wood you will use it on. I start at the grinding wheel, then progress to a drum sander, and I finish up on a buffing wheel. I slice some "Polish–O–Ray" buffing compound off the tube, melt it in a double boiler, then paint it evenly onto the buffing wheel and let it dry overnight. This aggressive buffing compound takes out the scratches put in by the sander. Carefully refine the edge until there is no light reflected off it. If you raise a burr on the back of the tool, remove it by stropping it on your jeans.

Once the edge is created, go ahead and harden the tool. It is not necessary to anneal after grinding if you have not "blued" the edge. Set up two opposing torches (I use model #JT99 from the Bernzomatic Company) and heat just the last two inches of the steel gradually and evenly, allowing the heat to seep into the

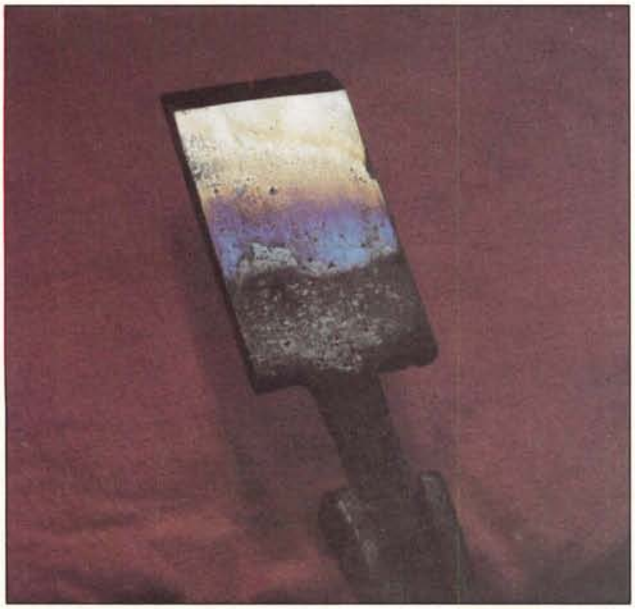


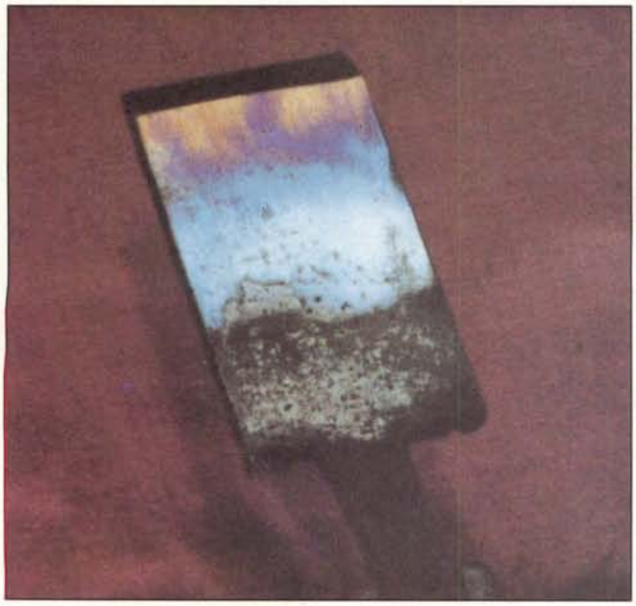
To tell if the steel has reached its critical temperature, touch a cow magnet to it. At 1450° it will lose its magnetism.

To harden annealed steel, heat it to its critical temperature, then quench it by plunging it vertically into the oil (so both sides cool evenly) then swirl it around.



After hardening the steel, buff off the oxidation and then reheat it again to temper it. Point the flame at the base of the tool, and allow the heat to move up toward the cutting edge.





Note the moving spectrum of oxidation colors. When purple reaches the edge, remove the flame; the steel will be properly tempered for use as a chisel or gouge.

bevel from other portions of the steel. When it reaches the critical temperature, quench it by lowering it vertically straight into the oil so it cools evenly.

Be careful not to drop the tool when it is hardened; it will probably break. As mentioned above, the tool needs to be tempered back from its total hardness so it can be honed more easily and so it will be less brittle under the stress of use.

The proper temper is determined by observing the oxidation colors as you reheat the tool. After hardening, there will be a grey–black color on the surface of the tool; polish this off with emery cloth or the buffing wheel.

Run the flame across the width of the blade at its base (just above the tang). The oxidation colors (pale yellow, darkening to a gold, into a purple, into a blue) will run up the body of the tool to the edge. The color that winds up at the edge when you remove the heat reflects the hardness. Pale or straw yellow is very hard and brittle, good for tools with odd shapes that won't be struck. Purple is the ideal color for chisels and gouges.

When the colors become apparent and start to move, remove the flame until the colors stop moving. Then add a little more heat to move the colors slowly up the tool. When the color you want reaches the edge, remove the flame. It doesn't matter how fast the steel cools at this point, so you can let it air cool or quench it in oil.

Slip a washer over the tang and apply your homemade handle to the tool. Hone it on your benchstones, and then start chopping. **PW**

For More Information

An excellent book for more in–depth reading on this subject is *The Making of Tools* by Alexander G. Weygers (Van Nostrand Reinhold Co., 135 West 50th St., New York, NY 10020).

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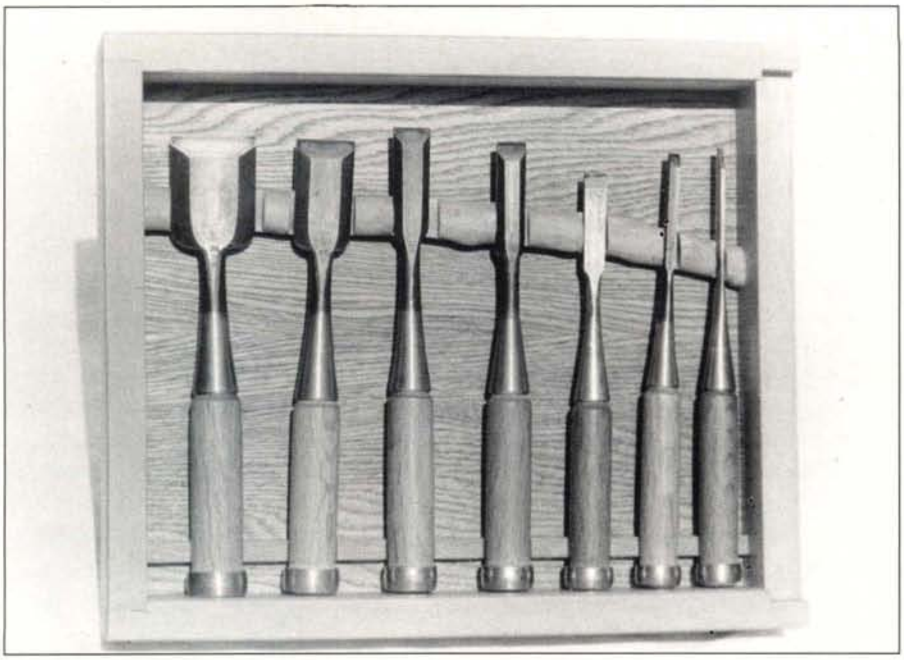


Every Chisel In Its Place

by Milford S. Brown

One of the problems associated with woodworking is the constant temptation to acquire additional tools. While it's true that replacing an old tool with another of better quality will not immediately improve the quality of one's output, it may accelerate the rate of advancement. In my case, I should have stopped with the purchase of only one poor chisel rather than buy a set of four. True, they were good enough to chop a hole through a stud for a water pipe (and they still hang on my pegboard for use when there is a possibility of encountering a hidden nail in such a job), but that's about the extent of their usefulness.

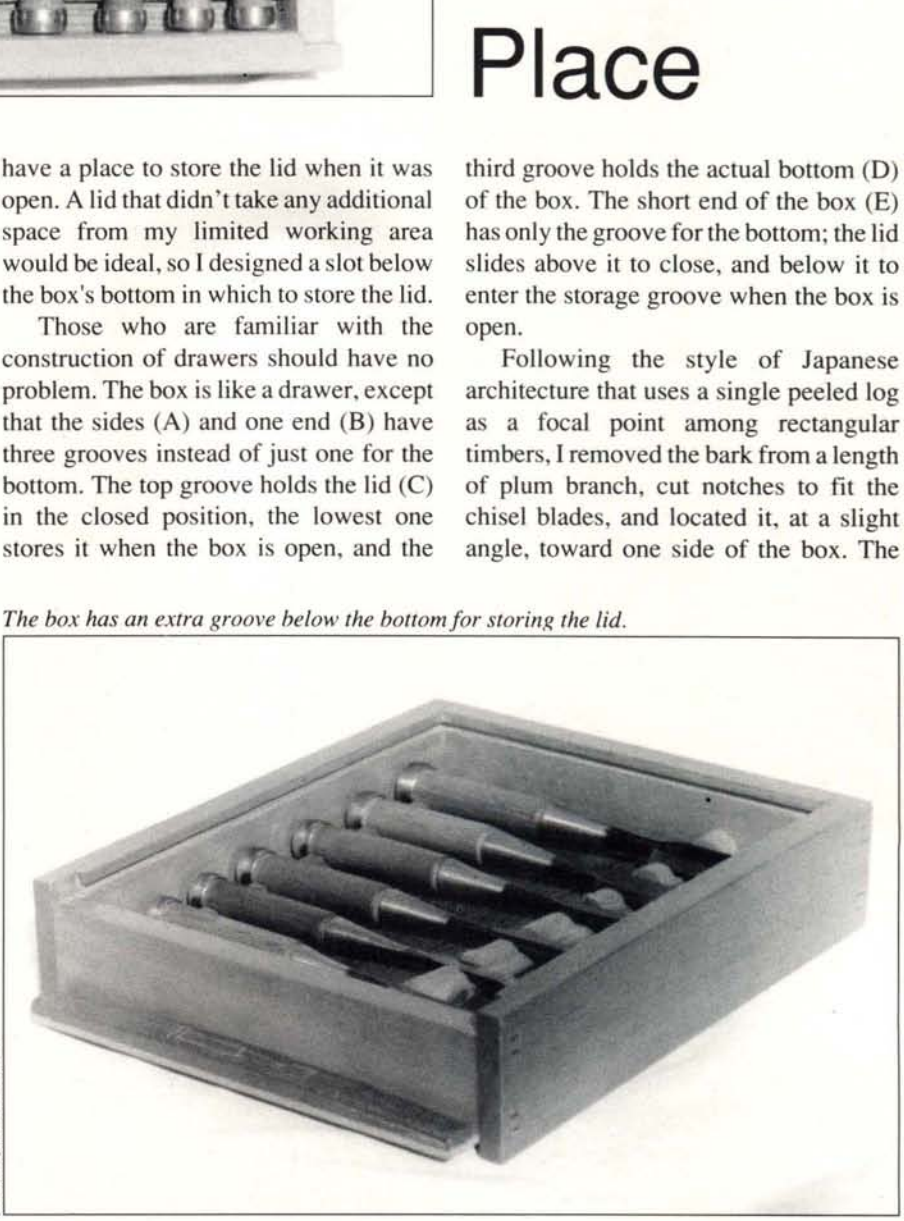
The introduction of traditional Japanese woodworking tools a few years later led me to the cautious purchase of a single laminated steel chisel. I was amazed by the sharpness and durability of its cutting edge, and in time found excuses to buy more. I also realized that the greater brittleness of carbon steel tempered to this hardness required that the tools be stored in a protective case. I thought the case should both reflect the quality of its contents and provide an opportunity to try some design ideas I had. One idea was to have a place to store the lid when it was open. A lid that didn't take any additional space from my limited working area would be ideal, so I designed a slot below the box's bottom in which to store the lid.

__Milford S. Brown__ is a woodworking hobbyist in El Cerrito, California, who enjoys using the tools and methods of both the East and West.

Those who are familiar with the construction of drawers should have no problem. The box is like a drawer, except that the sides (A) and one end (B) have three grooves instead of just one for the bottom. The top groove holds the lid (C) in the closed position, the lowest one stores it when the box is open, and the third groove holds the actual bottom (D) of the box. The short end of the box (E) has only the groove for the bottom; the lid slides above it to close, and below it to enter the storage groove when the box is open.

Following the style of Japanese architecture that uses a single peeled log as a focal point among rectangular timbers, I removed the bark from a length of plum branch, cut notches to fit the chisel blades, and located it, at a slight angle, toward one side of the box. The

The box has an extra groove below the bottom for storing the lid.



photos by Bradford Brown

exact position depends on the shape of the branch, the lengths of the various sizes of chisels, plus whatever appeals to the maker's esthetic sense. Japanese chisels have a metal hoop at the end of the handle to prevent splitting. A circularly notched strip of wood near the opposite side retains the handles by these hoops, thus keeping them in place within the box.

A box of this design, of course, is not limited to the storage of chisels, but could be used for any other small tools, parts, or whatever. In this case, the two pieces that form the chisel rack would be replaced with some other appropriate internal pieces.

Construction should begin after determining the required internal dimensions. For my chisel box that has an 11" × 10" inside measurement, the overall dimensions are 12-1/2" × 11-1/2", with 3/4" thick sides. Since the corner joints are a combination of a rabbet with a double through–mortise and tenon, the lengths of the sides and ends are the outside dimensions of the box. For a box this size, 1/8" plywood is suitable for the sliding lid and bottom. Therefore the height of the sides and the tall end should be whatever internal depth you want, plus 1-1/8". This provides for three 1/8" grooves with three 1/4" spaces. In my box, 3" high sides provide an internal depth of 1-7/8". The short end (E) is narrower by 3/4" to provide access to the lid grooves. The lid is sized to overlap one of the ends. The upper and lower grooves may have to be enlarged to slightly more than the lid's thickness to allow it to slide. For a handle (F), I glued on a strip of wood, on top of which I carved the outline of a Japanese chisel.

The only complicated part of the construction is in the corner joints, which should be cut after the grooves. Cut 3/4" wide × 1/4" deep rabbets across the ends of the sides (A). Cut two small tenons in the ends (B and E) as shown in the illustration. Note that the tenons are located against the inner face of these pieces. Use a marking gauge and lay them out on the narrower, single-grooved end (E) first. This piece can then be placed on the tall end (B) with the box bottom grooves aligned, to transfer the tenon positions. The tenons can then be used to locate the mortises on the sides.

Because the mortises are quite small, I started them with a drill and finished the corners with chisels, but purists may omit this shortcut, using only the chisels. The tenons are double–wedged with contrasting wood, so cut the mortises with a *slight* taper that widens toward the outside face. Drill a relief hole at the base of where the slots will be to prevent the tenons from splitting, then slot the tenons with a thin saw.

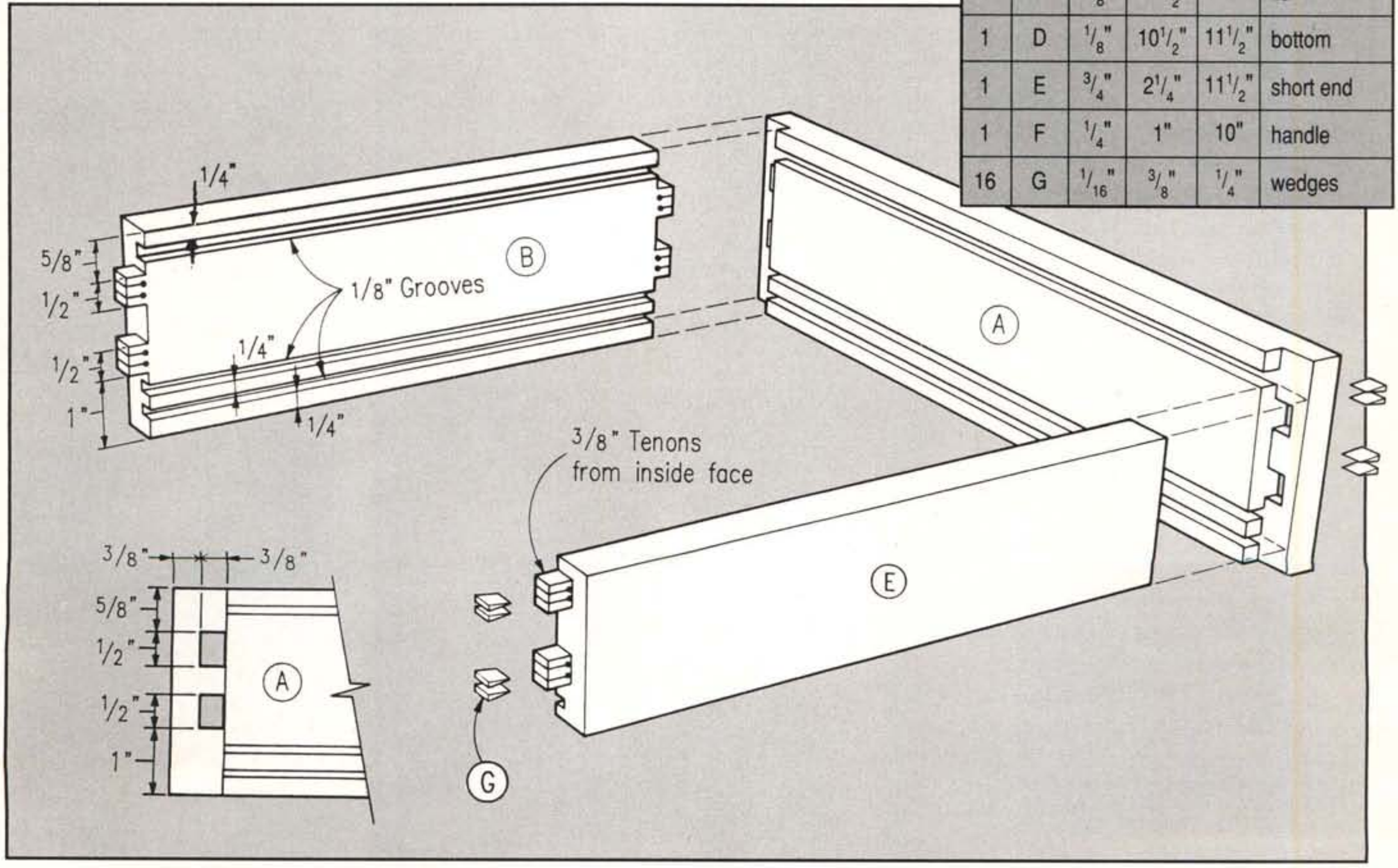
The very small wedges (G) are some–what difficult to cut. Chisel them from the end of a strip of wood that has been cut across the grain, and be prepared to cut more than the 16 that are required so you can select those of the proper thickness. After a trial assembly, glue and clamp the sides, ends, and bottom. Squeeze a small drop of glue into each tenon slot to retain the wedges, which should be inserted before the glue in the mortises hardens. Sanding and application of a clear finish will complete the box itself, after which the appropriate interior holders or dividers may be added. **PW**

Chisel Box

Cutting List

Qty	Part	Finished Size T	Finished Size W	Finished Size L	Piece
2	A	3/4"	3"	12 1/2"	sides
1	B	3/4"	3"	11 1/2"	tall end
1	C	1/8"	10 1/2"	12"	lid
1	D	1/8"	10 1/2"	11 1/2"	bottom
1	E	3/4"	2 1/4"	11 1/2"	short end
1	F	1/4"	1"	10"	handle
16	G	1/16"	3/8"	1/4"	wedges

illustration by Tom Larson



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Doweling Jigs

by Hugh Foster

If you have a drill press, you can perform most doweling operations by using a fence and stop arrangement (like Dana Batory's on page 24) and/or dowel centers—little marking devices that fit into a hole and precisely indicate the center of the hole on a mating piece so it can be drilled to match. Those without a drill press, however, will need some type of doweling jig.

Several factors should influence your choice of a doweling jig: the jig should be easy and quick to set up and use, accurate, and absolutely repeatable. The joints made with it should be absolutely invisible.

The main problem with doweling jigs is that casual use of them tends to multiply the minuscule errors which are inherent in any jig. A shop–made wooden jig, for example, will be progressively less accurate each time it is used, and while it is easily replaceable, in most shops, time is money. Commercial jigs with bushing that don't fit straight and square will be less accurate than those that do. More complicated jigs are likely to become less accurate with age and abuse because moving parts come out of alignment more readily when there are more of them. One thing that will help you to maintain accuracy is the simple matter of using your own doweling jig rather than someone else's. You'll learn to use it to the degree of accuracy and speed that suits you, and overcoming its idiosyncrasies will eventually be second nature to you.

Most old–timers I know use the "Dowl–it" #1000 or the Stanley #59 doweling jig. Virtually every school shop contains one or more of each. You've probably seen the Dowl–it jig enough times to know about its heavy aluminum sides: lack of loose parts; patented automatic self–centering action which ensures accurate center drilling with up to 2" thickness capacity; and the five clearly marked hole sizes (1/4", 5/16", 3/8", 7/16", and 1/2") permanently cast in the sides. If you can remember to align all your work from the same side as you put it in the jig, the Dowl–it should make awfully good joints for an awfully long time.

However, I don't understand why these old–timers don't prefer the Dowl–it #2000 jig as I do; its 7/16" and 1/2" holes are still "set" in the drill block, but the 1/4", 5/16", and 3/8" holes can be paired with the bushings at about 3/4" (on center) apart. This

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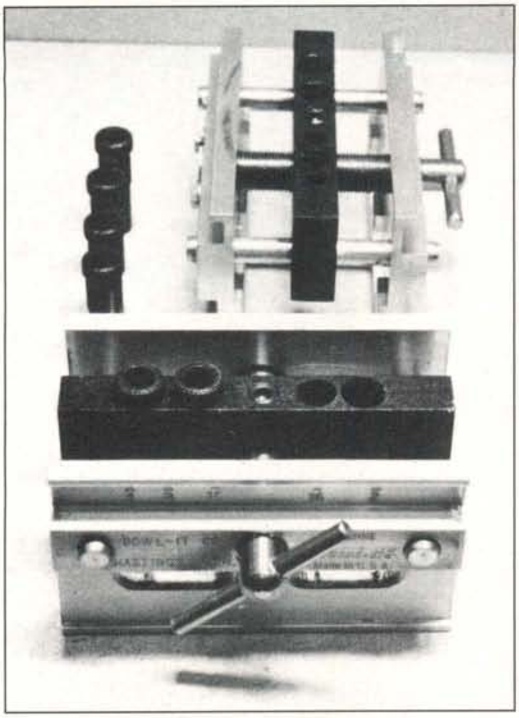
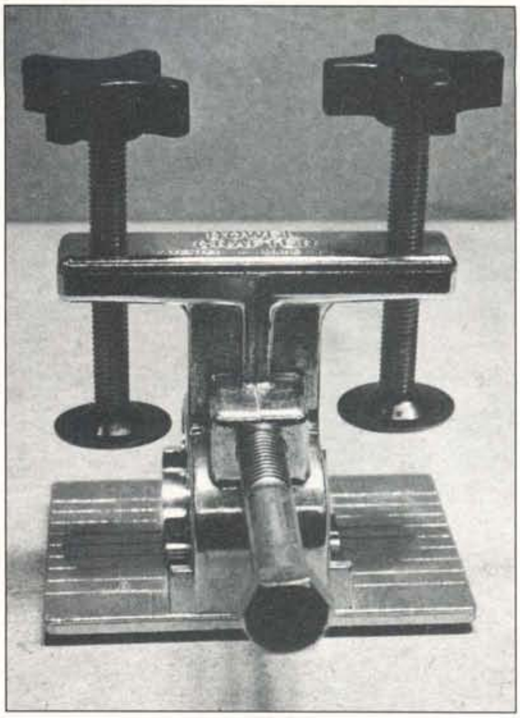
Hugh Foster *is a part-time furniture designer/builder in Manitowoc, Wisconsin.*



Dowl–it #1000 (foreground) and # 2000



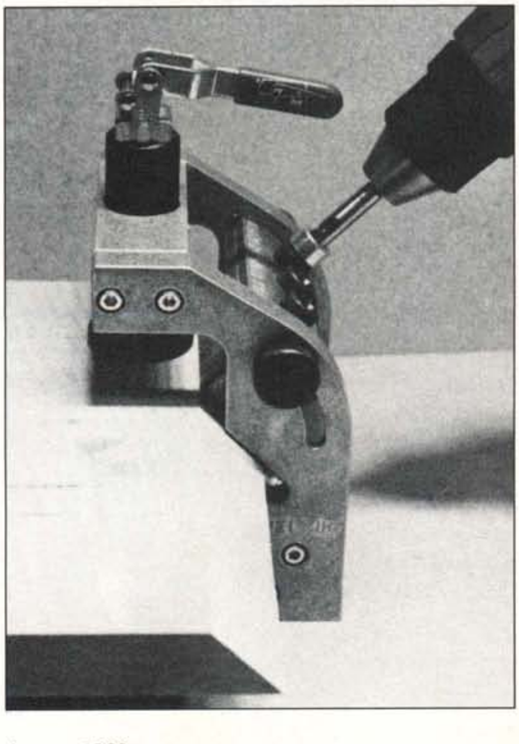
Dowel Crafter

is especially useful when assembling face frames. Indeed, this is where another jig, the Dowel Crafter, offers some competition: its holes are adjustable from about 9/16" to 2" apart on center. Your preference will be determined by how you feel about "off–centering" the work, which is easier with the Dowel Crafter jig, and by whether you prefer bringing the jig to the work or the work to the jig. The Dowel Crafter jig has a nifty quick-mount attachment for your vise. I have a feeling—but no *real* proof—that bringing the work to the jig might be better for the jig in the long run, unless you are less afflicted with the "dropsies" than am I.

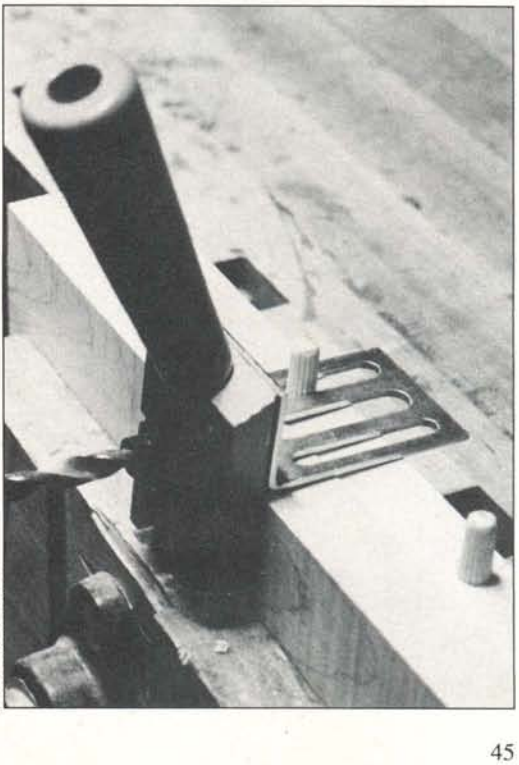
Another feature that makes the Dowel Crafter ideal for all edge–to–edge doweling is that its two revolving turrets permit staggered holes. Its twin clamping surfaces guarantee perfectly mating holes, and its indexing marks are both logical and plainly visible all the way around the jig.

So far, the jigs I've mentioned are good only for edge–to–edge joints. Since there are other types of joints that sometimes have to be doweled together, none of the jigs we've discussed so far will suffice by itself.

The special beauty of Kaufman's jig is that it's adjustable to countless angle positions; only this one can readily join parts at other than 90° or 180°. Everything about the jig is incredibly adjustable: the table moves up and down; the angle of the bushing block will rotate through 45°; an adjustable toggle clamp holds the work in place; and the user even gets a choice

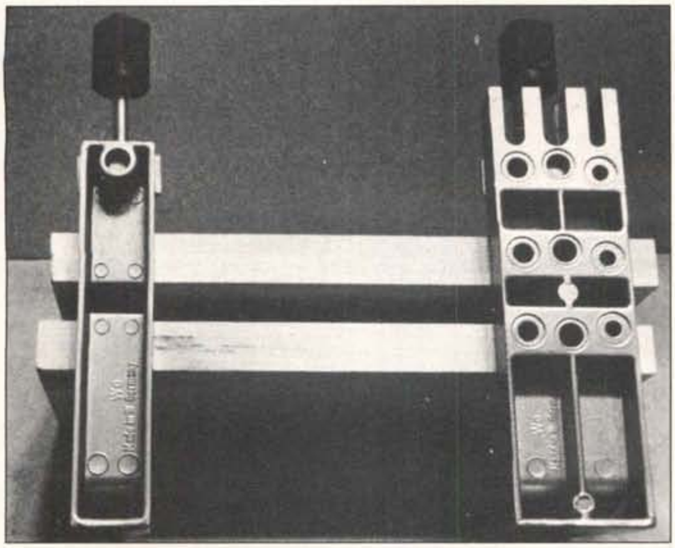


Kaufman's

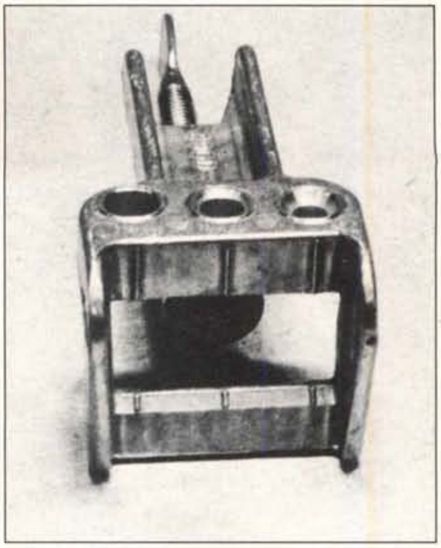


Arco # 582

photos by the author



Wolfcraft #3751

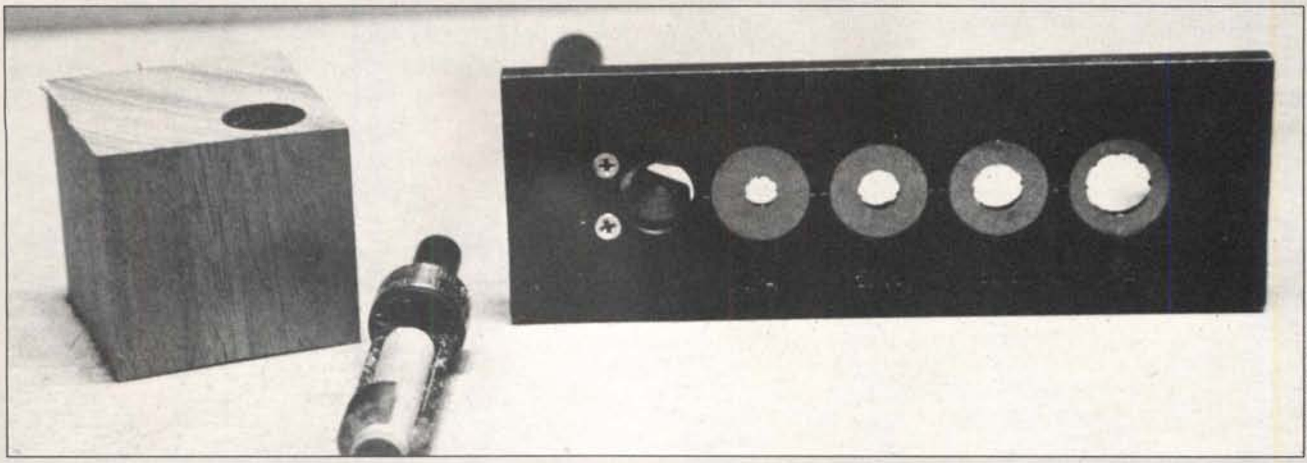


Vermont American

of two quick, easy ways to mount the jig.

The manual advises users of the Kaufman jig to be sure to use a drill stop when drilling angles to be sure not to drill into the jig's moveable table; this brings to mind a catch: when doweling other than edge–to–edge joints, the length of the dowel is limited by the thickness of the boards being joined, minus whatever margin you feel comfortable with for sanding and finishing. This massive jig is the most expensive of the lot (though not on a cost per pound basis!), so you may not want it if all you do is edge–to–edge joining. However, if you have lots of angle joints to dowel together, this is far and away the best choice. You can modify many of the others so they will cut angles like the Kaufman cuts, but when you're jigging a jig, you've got to be losing accuracy.

Early models of this jig had no means for locking the adjustable table; now they've added a lock knob to the side, eliminating this flaw. If you have the early model you can have it updated at no charge; just return it prepaid, and enclose $5 to cover return shipment. This jig's heavy castings are square and true, but the bushing block could use a centering mark on the side



photos by the author

Shop-Made Dowels

Commercial dowels are far less expensive than shop–made ones (unless you place no value on your time), and better, too. I've heard of people squeezing regular dowels with pliers to serrate them, and of setting up fancy band saw jigs to spiral cut them (at goodness knows what risk to fingers!)—all in an effort to save a couple of cents on the commercial product! If you use only a few pins a year, hardware store prices should be acceptable; if you have a need for thousands, the mail order houses are likely to save you quite a bit unless you need other than birch or maple dowel pins.

If that's the case (or if you just insist on making your own dowels), you'll want a set of General Dowel and Tenon Cutters (# 9886). They come in four sizes: 1/4" × 1-1/4", 5/16" × 1-3/8", 3/8" × 1-1/2", and 1/2" × 2". Each cutter has a 3/8" shank, but they should be used in a drill press, not a portable drill. On my drill press, at 410–rpm, these tools cut dowels in mahogany like a hot knife through soft butter.

You'll also need the General Dowel Former & Chamfering Tool #887 to cut the flutes and chamfers in the dowels you make. Chamfering helps guide the dowel, avoid splitting, and it improves the alignment of the pieces to be doweled. The tool is like a slightly oversized hand–held pencil sharpener that has different openings for different diameter dowels.

Doweling Jigs

Manufacturer	Model #	List Price	Country of Origin	Max. Stock Thickness	Dowel Sizes	Bushing Depth	Type of Joint
Arco	581	$29.95	USA	2–3/8"	1/4" 5/16" 3/8"	3/4"	A, B, C, D, E, H
	582	12.50	USA	2–3/8"	1/4" 5/16" 3/8"		A, B, C, D, E, H
Disston	5350	29.95	USA and W. Germany	1–5/8"	1/4" 5/16" 3/8"	1"	A, B, C, D, E, F, G, H
Dowel Craft	Dowel[1] Crafter	44.95	USA	2–3/8"	1/4" 5/16" 3/8" (or optional turrets available)	1–3/8"	A, B, C, D, E, H
Dowl–it	1000	35.90	USA	2"	1/4" 5/16" 3/8" 7/16" 1/2"	1–1/2"	A, B, C, D, E, H
	2000	49.99	USA	2"	1/4" 5/16" 3/8" 7/16" 1/2"	1–3/4"	A, B, C, D, E, H
General[2]	840	25.52	USA	4–3/8"	turret	1"	A, B, C, D, E, H
	841	37.96	France	2–3/8"	1/4" 5/16" 3/8"	1"	F, G
Quality Craft Tools	Kaufman's	129.95	USA	2"	1/4" 5/16" 1/2"	1–3/4"	A, B, C, D, E, H, I
Marples[3]	M148	77.95	England	unlimited (w. accessories)	1/4" 5/16" 3/8" 6mm 8mm 10mm	7/8"	A, B, C, D, E, F, G, H
Stanley Tools	#59 (04-059)	46.95	USA	2–7/8"	3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	1–1/8"	A, B, C, D, E, H
Vermont American	17188 (7910)	9.90	USA	2"	1/4" 5/16" 3/8"	1/2"	A, B, C, D, E, H
Wolfcraft	4641	12.99	W. Germany	1–5/8"	1/4" 5/16" 3/8"	1"	A, B, C, D, E, F, G, H
	4660[4]	24.99	W. Germany	1–5/8"	1/4" 5/16" 3/8"	13/16"	A, B, C, D, E, F, G, H
	3751[5]	39.99	W. Germany	2–1/2"	1/4" 5/16" 3/8"	11/16"	A, B, C, D, E, F, G, H

[1] Distributed by Grizzly Imports

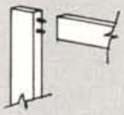
[2] Sears' Craftsman jigs are identical

[3] Distributed by Anglo–American Enterprises

[4] Distributed by The Woodworkers' Store

[5] Distributed by The Fine Tool Shops Inc.

Type of Joint



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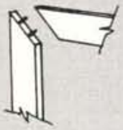

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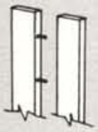

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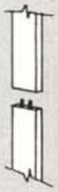

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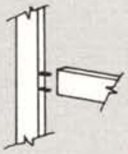

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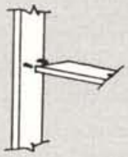

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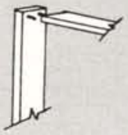

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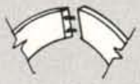

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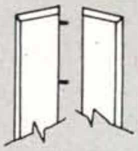


I

For More Information

Arco Products Corp.
110 West Sheffield Ave
Englewood, NJ 07631

Anglo–American Enterprises Corp.
401-403 Kennedy Blvd.
P.O. Box 24
Somerdale, NJ 27401

The Disston Co.
1020 West Market St.
Greensboro, NC 27401

Dowel Craft Co.
2542 Tartan Drive
Santa Clara, CA 95051

Dowl–it Co.
P.O. Box 147
Hastings, MI 49058

The Fine Tool Shops Inc.
P.O. Box 7092 Dept. 9PW
Portsmouth, NH 03801

General Hardware
Manufacturing Co.
80 White St.
New York, NY 10013

Grizzly Imports
2406 Reach Road
Williamsport, PA 17701

Quality Craft Tools, Inc.
1703 E. Monroe St.
Goshen, IN 46526

Stanley Tools
600 Myrtle St.
New Britain, CT 06053

Vermont American Tool Co.
Indian Creek Road
Box 340
Lincolnton, NC 28092

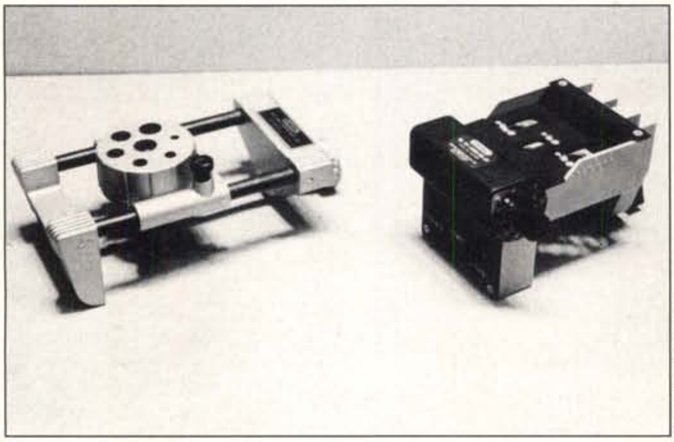
Wolfcraft of America, Inc.
1107 Lunt Ave., #6
Schaumburg, IL 60193

The Woodworkers' Store
21801 Industrial Blvd.
Rogers, MN 55374

somewhere to show when edge holes are exactly centered.

The ARCO 3–in–1 dowel jig #582 is for simple, accurate doweling of corner butt joints, edge–to–edge joints, and T–joints. The maker says, "The combination of line–up bracket and preset distance for dowel locations guarantees perfect alignment of matching holes without cumbersome measuring and guesswork." Their other model, #581, claims, "Does More than Any Other Dowel Jig! One-step operation jig for drilling all holes at the same time in both work pieces with accurate alignment of matching holes." This is mostly hogwash; I'd be happier without the hyperbole. For the money, these are good American–made doweling jigs in a field of comparably priced, good doweling jigs.

Disston's Dowel Magic Plus Kit #5350 includes a doweling jig *exactly like* Wolfcraft's #4641, but the kit also comes with 1/4", 5/16", and 3/8" brad point wood drills with adjustable stops, and five dozen fluted and chamfered dowels in assorted sizes. No written instructions are needed with this simple plastic jig. If country of origin really matters, the drills are made in Austria, the jig is made in West Germany, and the dowel pins are made in the USA. The Wolfcraft #4641 has good directions on the carton and a better English language insert than with the Disston set containing this jig.


General #840 and #841

photos by the author

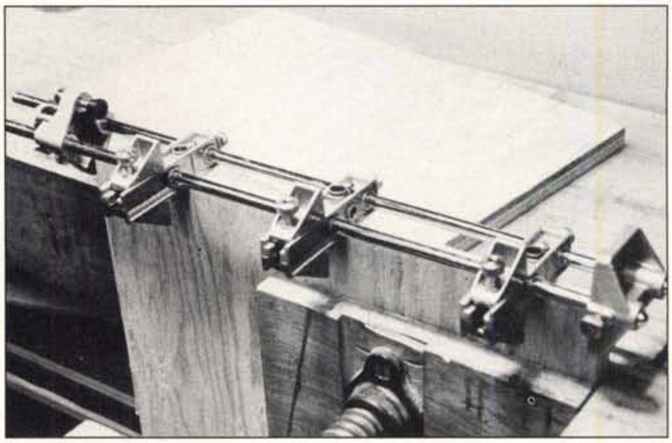
Wolfcraft's Universal Doweling Jig (#4660) "Dowel–Master" is, so far as I can tell, more or less exclusively available from The Woodworkers' Store. It's a self–centering jig for materials up to 1-3/8" thick, and it can be used for corner and T–joining as well. The instructions are more difficult than they need to be; you'll learn everything you need to know about operating this simple jig by looking at the manufacturer's photos.

Wolfcraft's model #3751 is available from The Fine Tool Shop. The instruction manual is supplied in 7 languages; once again, the English language instructions make using this jig appear more complicated than it actually is. Should you choose this jig, read the instructions away from your shop, figure out what you can from them, then go play with the thing to discover for yourself what it can do. After you get the hang of it, it's good for corner joints, T–joints, and edge–to–edge joints.

The General Dial Setting Doweling Jig (#841) seems preferable as a complement to its cousin, the #840 jig, rather than as the be–all, end–all, do–all of jigs. Its initial plastic impression gives way to an impression of reliable underpinning. The jig includes 3 drill stops for accurate depth control and its color-coded dial selects dowel hole size and position based on wood thickness. The jig's applications are right angle and T–joints.

General's Revolving Turret Doweling Jig (#840) features a spring positioning revolving turret that accepts both standard twist drills and the preferred brad point drills. Graduated guide rods assure proper alignment of dowel holes. General's manual shows how to use the 840 for edge–to–edge and surface doweling, which are useful for end joints, multiple stock joints, corner joints, round joints, and preliminary mortising. One could surely do lots worse than the 840/841 pair of doweling jigs; between them, they will accurately cut any doweled joint except the angled joint which appears to be a Kaufman exclusive.

The Vermont American 17811 (7910) Dowel Jig is the least expensive of the lot; its best feature may be its guarantee: "Vermont American Tools must give the user complete satisfaction or be replaced free of charge." If a jig requires an extensive manual, there is probably something amiss with its design. Some of the jigs contain wordless instructions that are better than their verbal counterparts. Only the Marples/Record Doweling Jig (#148) really *requires* instructions—and then only for those of us who hope to use 100% of its great potential. It will do things that other jigs only dream of; it eliminates the need for precise marking out and ensures ease of assembly without error. The "bare" jig comes with 6" rods, a jig clamp and a set of drill bushings for 1/4", 5/16", 3/8", 6 mm, 8 mm, and 10 mm, and a comprehensive instruction manual that is easily the best of the lot. A careful worker, one who has "accurate" habits, will be able to do things with this jig that are impossible with any of the others or any combination of them. In the chart, I rated it as the most difficult, but considering its versatility, it really isn't difficult at all.


Marples #148

Accessories for the Marples/Record include extra bushing carriers, extra fences, extra bushings, and rods of 12", 18" and 30". If it matters, this is the jig I have used for the past many years; having played with all the others, I still regard it as my doweling jig of choice for all but simple edge–to–edge joining.

Finally, there is the question of doweling verses plate joining. As doweling jigs get fancier and ever more expensive, plate joining gets ever more cost competitive. Plate joining is faster and the biscuits have more gluing surface than do dowels. However, dowels will go places that biscuits won't. This fact alone means there will always be a need for doweling jigs. PW

Green Woodworking

Peel Yourself A Settee

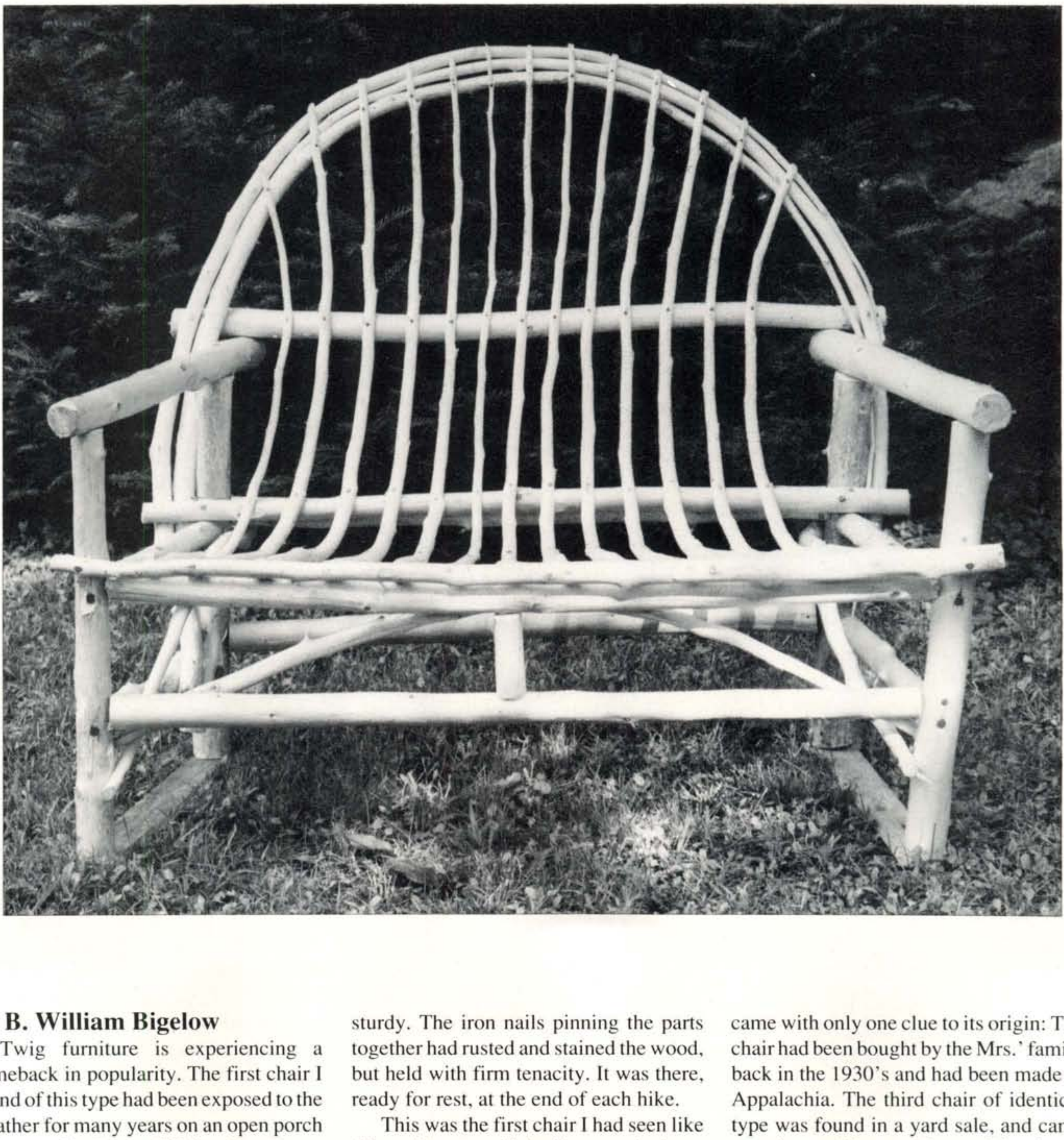


photo by Deborah Porter

by B. William Bigelow

Twig furniture is experiencing a comeback in popularity. The first chair I found of this type had been exposed to the weather for many years on an open porch in the woods of central Maine. It was grey and weathered, but still comfortable and sturdy. The iron nails pinning the parts together had rusted and stained the wood, but held with firm tenacity. It was there, ready for rest, at the end of each hike.

This was the first chair I had seen like this and I assumed it had been made there. Since then, I've found two others so similar they must have been made by the same person or group of people. The second chair I came across belonged to a retired minister's family in Surry, N.H. It came with only one clue to its origin: The chair had been bought by the Mrs.' family back in the 1930's and had been made in Appalachia. The third chair of identical type was found in a yard sale, and came complete with a rather wild tale of buccaneers and smuggling. By its mere presence, however, it suggested this type of chair must have been fairly numerous at one time.

One rainy day, a friend and I decided

***B. William Bigelow** is a high school woodshop teacher in Surry, New Hampshire.*

to make a chair from the original design. The cedar trees growing near the abandoned logging road would provide the lumber. Our tools included a bow saw, pocket knives, a rusty hammer, and a similarly rusty box of nails. I notched a stick for a measuring device and marked off the existing chair.

The chair plans here differ from the original only in the curved brace under the chair frame. The original had straight braces cut at a 45° angle. I felt the curved brace would be more graceful as well as easier to cut.

Five hours later, with the constant advice of my five–year–old son, we finished. It was very satisfying to make a chair with simple resources. I had been challenging myself with more and more demanding projects for the past few years, and a return to the simplest of tools was very relaxing.

Choose wood that's limber and bendable. Although wood choice may be limited to what's available, several characteristics are important. If you're going to peel the wood, choose a species that will not be gummy or resinous to clothes when peeled. Try to get a light, strong wood that will not split when you nail it.

Cut a quantity of wood as thick as your wrist, tapering down to the size of your little finger. The back and bent seat will require branches up to 6' long, as straight as can be found.

Cutting the parts to length with a bow saw is the safest and easiest way. If shop equipment is used, several safety practices should be observed. Cutting round and irregular stock is not a safe practice on the table saw. The stock may shift and roll and nasty kickbacks are possible. If the branches are trimmed on the band saw, a V–block should be used to keep the wood from rolling and breaking the blade.

Nail two end frames together as shown in Figure 1. The wood you use should be no thicker than your wrist, or the furniture may appear too clunky when

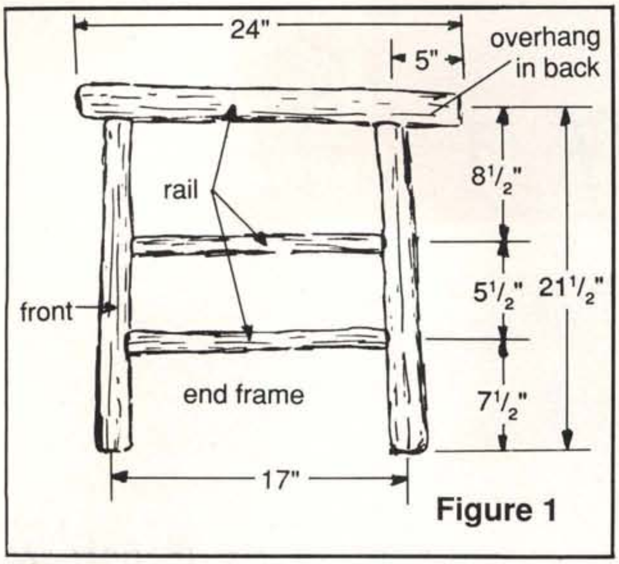


Figure 1

The wood you use for the end frame should be no thicker than your wrist, or the furniture may appear too clunky.

Join the end frames together to form the basic frame.

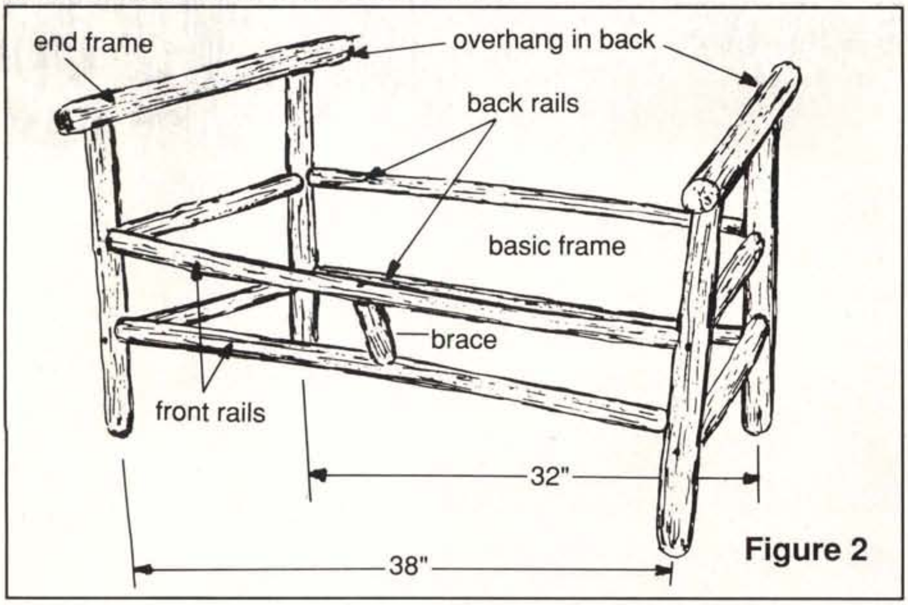


Figure 2

Nail on three supports (A, B, and C) for the back and seat parts.

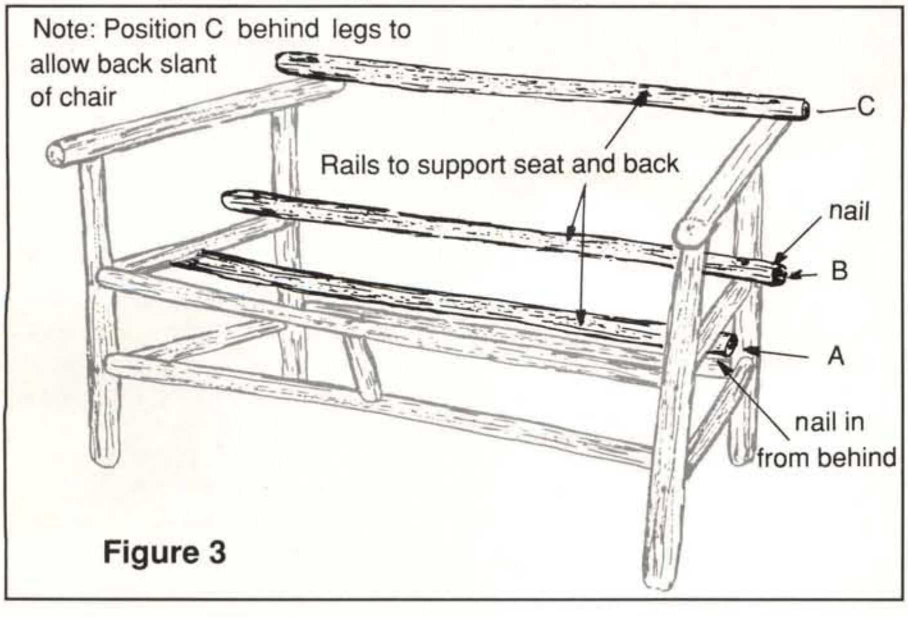

Note: Position C behind legs to
allow back slant
of chair
C
Rails to support seat and back
nail
B
A
nail in
from behind

Figure 3

finished. Next, join the end frames together to form the basic frame (see Figure 2). Make the frame 6" narrower in the back than at the front.

Nail on three supports (A, B, and C) for the back and seat parts as shown in Figure 3. Part C on the armrest must be nailed slightly behind the rear legs to provide a comfortable, backward lean. Let parts B and C hang out 6" or so from the chair frame on either end. They will be trimmed to size afterwards.

Add three back bows and a brace under the chair as shown in Figure 4. Choose the back bow parts carefully. They must be straight and limber. If the butt of each piece has a slight crook, they are easier to secure to the chair. Nail the butt end first, and bend the small end down to be secured. Reverse direction on the next bow. The back bow parts nail behind part B and in front of part A. Trim off the excess from part A and B that hang out beyond the back bow parts. Finally, bend and nail a brace under the front frame of the chair to add rigidity.

Nail part D in place. It should be located so the seat branches will butt into part D and then be bent down and nailed to the frame and eventually to the back bow.

The seat branches should be selected to be as close to the same thickness as possible. Note that the seat twigs are close together on part B as shown in Figure 5. They spread apart slightly over the length of part A and fan out gracefully over the back bows. Space these branches close enough for comfort, and nail first in part B; then spread and nail the other ends to part C and the back bows.

Nail two boards under the chair to the legs. This will keep the side frames from spreading apart over the years.

For the final fitting, sit in the chair with a pocket knife, and whittle off any knots and protrusions that feel uncomfortable. Whittle chamfers on the armrests and parts that show. Perhaps, to settle future arguments, whittle your name and the date the chair was made. PW

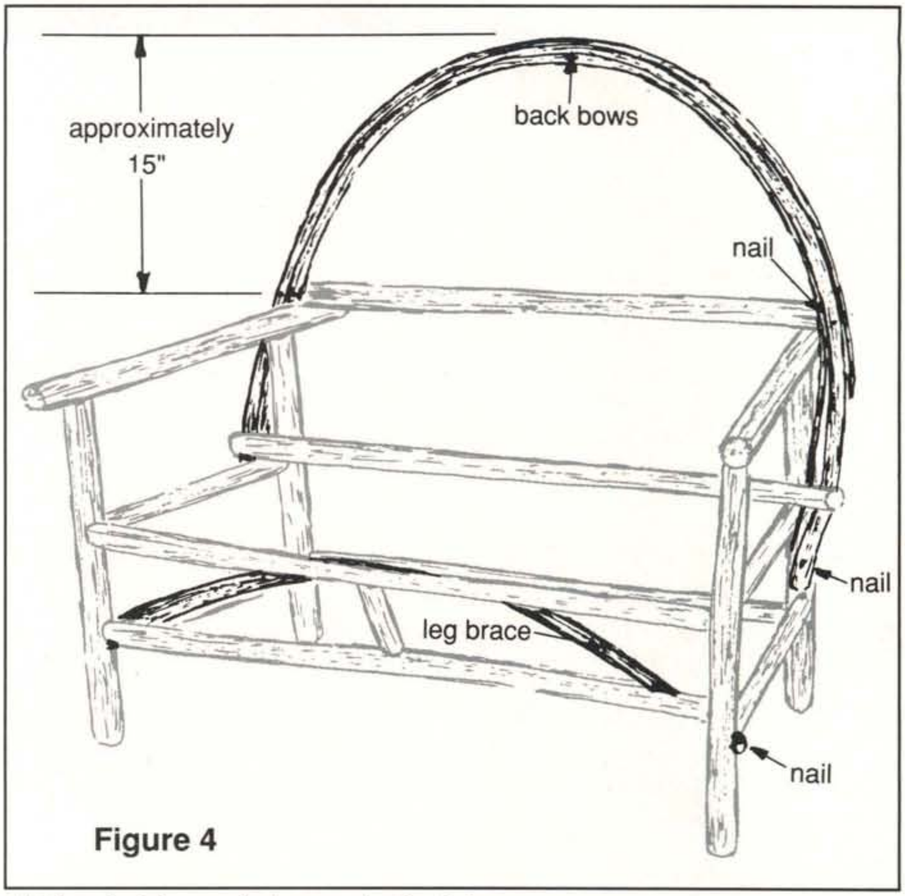


Figure 4

Add three back bows and a brace under the chair.

The seat branches are spread apart slightly over the length of part A and fan out gracefully over the back bows.

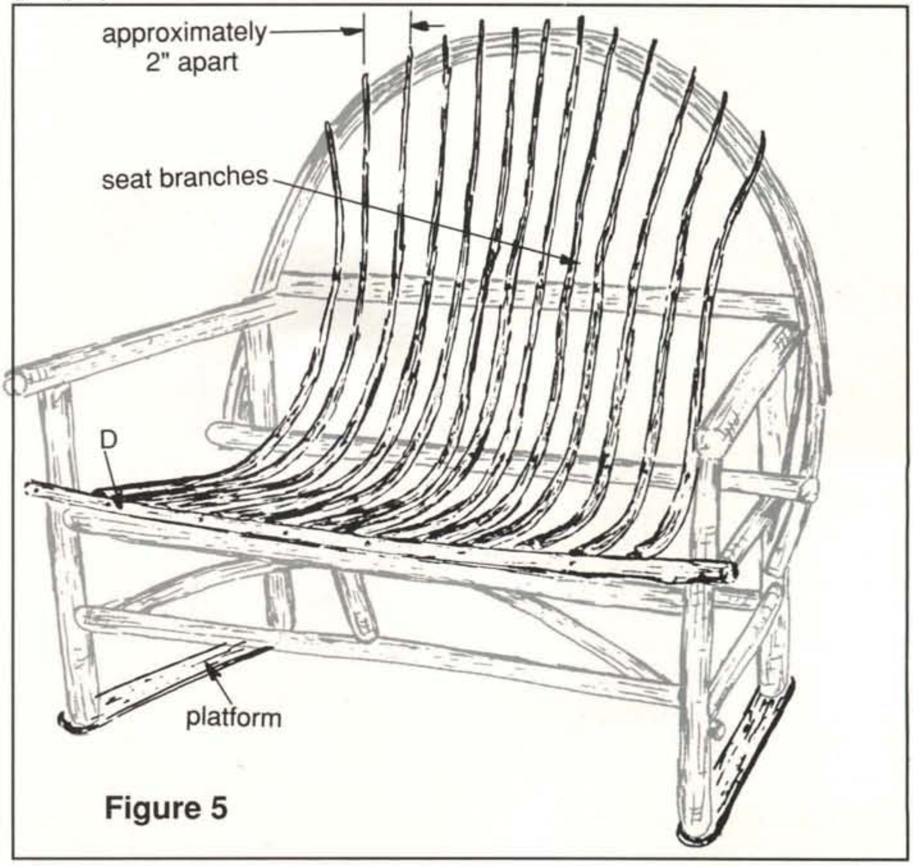


Figure 5

illustrations by John Nelson

Focus on Carving

Getting Started in Woodcarving

by William H. Mc Master

As active woodworkers and readers of this magazine, you already know how satisfying it is to make something in wood; whether it's a chest, chair, mirror frame, or a host of other projects that have been described in past issues. The beauty of many of these objects can be greatly enhanced by decorating them with carving, which will give them an even greater variation of texture and add to their grace and beauty. You can combine your manual skill with an artistic feeling, and make your project a distinctly individual piece.

In recent issues of *Popular Woodworking* I have been describing some advanced projects and techniques. I hope that this has aroused the interest of woodworkers who have not yet taken up the pleasures of woodcarving. In this article, I would like to back up to the beginning for those of you that haven't yet started carving. Thus, I will discuss the tools you will need to get started in carving and some of the woods that you might consider using.

Tools and Equipment

The beginner should buy only a few tools at a time, and then only when he finds a need for them. I do not recommend buying sets of tools because they generally have several that you will rarely use, and that's not really saving you any money. As your skill develops, you will want to add to your collection of tools according to the wood you use and the types of carvings you do, but buy new tools only when you have the need for them.

Cutters

The most common cutters are the woodcarving gouges which have concave cutting edges and vary according to their curvature, shape, and length. You should buy only good tools that will take and hold a razor edge in the hardest wood you intend to carve. Cheap tools are usually made from a softer steel and will not hold an edge, so you have to do a lot of sharpening. The harder steels can attain and hold a thinner and smoother edge and are best for delicate detail work. When obtained from the manufacturer they usually come ground only and must be sharpened before they can be used. This allows the carver to adapt the bevel to his style of carving and the type of wood he plans to carve. Even if they have been sharpened, you will find that you have to fine–tune them to your own carving style.

The Cutting Edge

The cutting edge on carving tools comes in various shapes and is used for different purposes. I will briefly describe each of these.

Chisels are flat with no curvature. They cut well along the grain, but are not of any use across grain. They have one beveled side with the other flat, and are used mostly in carpentry. In carving they are useful for rounding convex surfaces; however, this function can be done equally as well by firmers. If you do not already own chisels, I would not recommend that you buy any just for carving.

Firmers are similar to the chisels but have bevels on both sides. They are used for setting down vertical edges and paring flat or slightly rounded surfaces. However, like chisels, they have but limited usefulness in carving.

A **skew** is a firmer in which the cutting edge has been skewed at an angle forming a sharp point. It's used for cutting straight edges, undercutting, and for getting into sharply angled corners. The skew is the most useful of the flat tools. Do not confuse these with the skew chisels which have either a right– or left–hand

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William H. McMaster is Chief of the Education Division of the California Carvers' Guild. His "Focus on Carving" is a regular feature in PW.

Gouges are identified using a numbering system based on the fraction of a circle contained in the sweep.

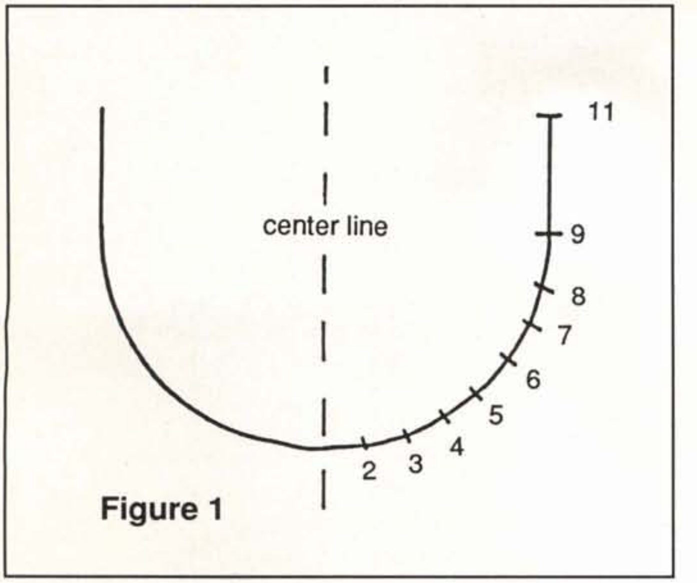


Figure 1

Below are some different sweeps and how they relate to the same width of gouge. Thus gouges of the same size can have different radii of curvature, with the largest number having more of the circular section.

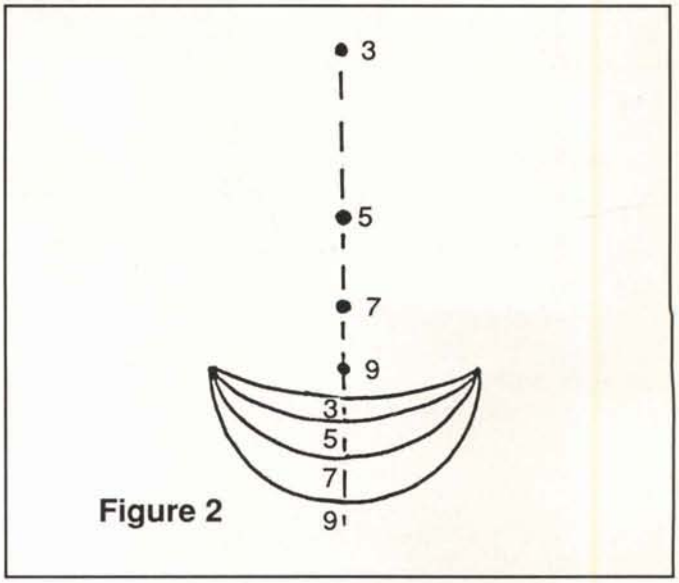
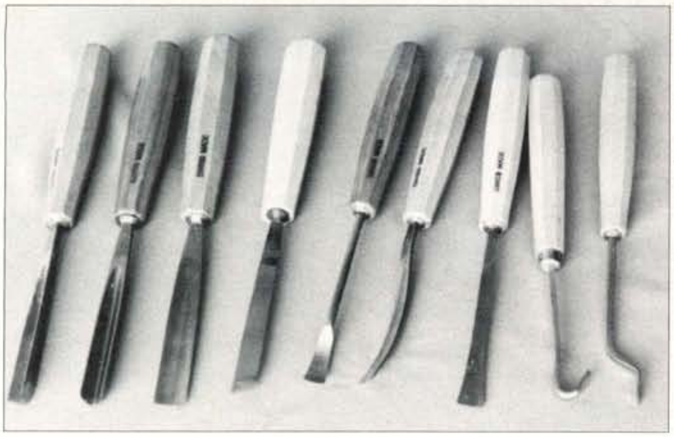


Figure 2



Various shapes of the standard woodcarving gouges

photos and illustrations by the author

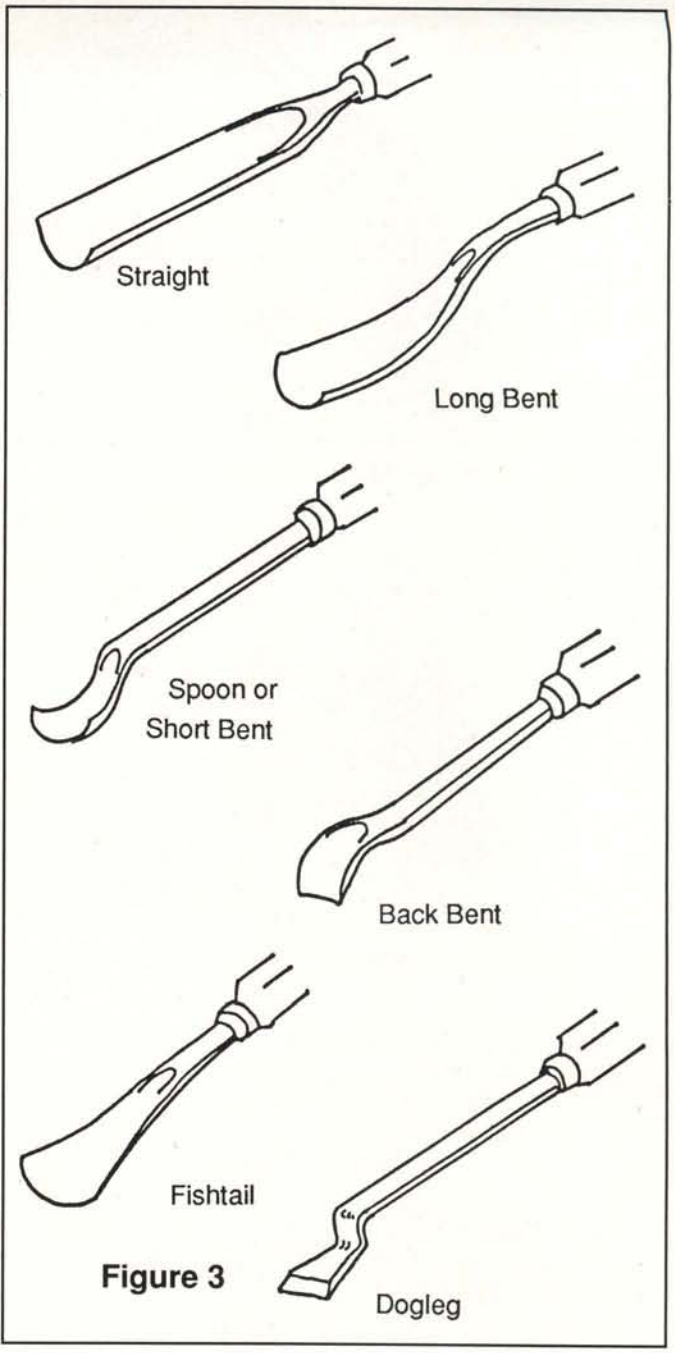


Figure 3

There are six basic shapes for the shaft of the tool; and each has its own use.

single bevel.

Gouges are the most commonly used tools in carving; they have a circular profile, known as the sweep. Gouges are identified using a numbering system based on the fraction of a circle contained in the sweep as illustrated in Figure 1. Figure 2 shows some different sweeps and how they relate to the same width of gouge. Thus gouges of the same size can have different radii of curvature, with the largest number having more of the circular section. This numbering system can differ slightly among manufacturers.

Veiners are U–shaped gouges. They are called veiners since the smaller ones are very useful in carving the veins of leaves. When turned over, they can carve a slender stem in relief if they have been sharpened with a slight micro–bevel on the inside. These tools are used mostly in lettering and carving delicate lines and grooves. They are also extremely useful for texturing surfaces.

Parting or V–Tools come in three angles: 45°, 60°, and 90°, with the 60° tool being the most useful and the 90° one the hardest to use. They are used for outlining, finishing corners, carving sharp–edged grooves, and in lettering when a V–shaped groove is desired. For most purposes you will want the apex edge of the V to be rounded for easier cutting.

Tool Size

Full–size tools are generally 9-1/2" to 11" in length with blades approximately 4" long. These are the easiest to use and should be your first purchase. Smaller tools that are approximately 6" long are most useful for small carvings. They are sometimes called a beginner's set, but I would not recommend them for beginners. Block–cutting tools are generally small–sized with half–round handles for palm control. The larger and heavier tools are referred to as sculptor's gouges.

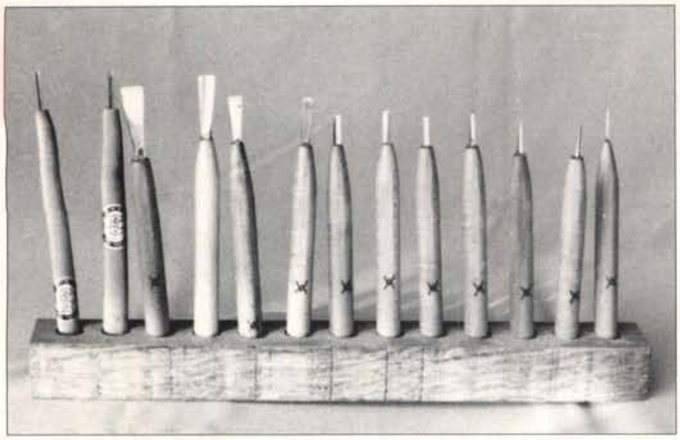
Tool Shape

There are six basic shapes for the shaft of the tool; and each has its own use. Examples of these tools are shown in Figure 3 and the photograph above. The **straight** gouges are the standard shape and are the most useful. The others are for special purposes. For instance, the **long bent** gouges are primarily used for relief carving and the carving of concave shapes such as the inside of bowls. The **short bent** gouges are for deep relief and concave carving in confined spaces which cannot be reached by the other gouges. A **back bent** gouge is convex instead of concave and has limited use in carving. It is used in deep relief mostly to carve the undercut. **Fishtail** gouges have the cutting edge wider than the main shaft so they can reach beneath projections and into corners. They are used for carving in tight areas and for making sharp corners. The #3 sweep fishtail gouge is a very popular tool, especially in the larger sizes. The dog **legs** are generally chisels designed for finishing flat recesses on relief carvings. The sides are tapered back to facilitate undercutting.

Handles

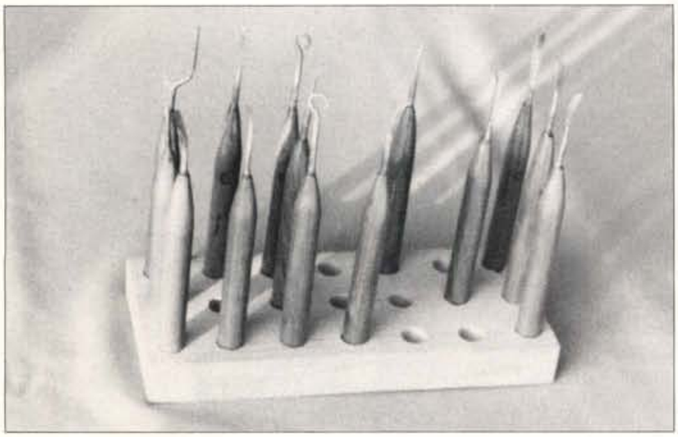
Tool handles can be either octagonal or round. You should choose the shape most comfortable for your use. English tools such as Marples and Henry Taylor have round handles, as do the Japanese tools. The Continental tools such as the Swiss and German usually come with octagonal handles.

For delicate detail carving, I prefer to use pencil–grip gouges as shown in the photograph above. These are small gouges that



The author has remounted the tool shafts into pencil-size handles for delicate work – the two tools on the left are Japanese.

photos by the author



Different shapes and coursenesses of riffler rasps and files can be obtained from jewler's supply stores.

I have removed from the manufacturer's handles and remounted in a dowel rod with only about an inch of the blade protruding. These can then be held like a pencil and easily rotated to match the contour of the carving.

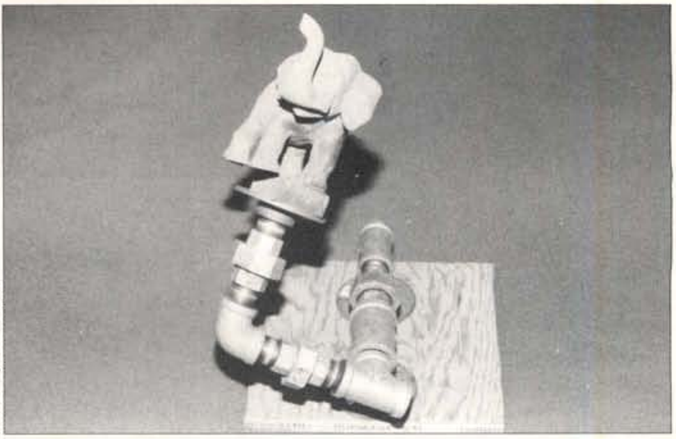
Japanese Tools

The Japanese make a full line of carving tools with blades made of two layers of steel laminated together. The cutting edges are made from an extremely hard carbon steel which will take a keener cutting edge than other tools. This hard steel is laminated to a layer of softer steel, to provide strength and protect the cutting edge.

Their smaller gouges differ greatly from the common European variety. These small tools are extremely useful for the carving of delicate details. They are made with a thinner laminated blade with a pre–sharpened shallow bevel that gives the tool a small cutting edge. The handle is also different and allows you to hold the tool the same as you would a pencil. This gives extra control for the carving of fine details. Two of these are illustrated in the photograph.

Sharpeners

Dull gouges are hard to carve with and are dangerous to use because they require more force and are thus harder to control. Your gouges will need to be continually sharpened and honed while carving, and for this I recommend the use of Japanese water stones. They are cleaner to work with, and sharpen faster and better than the oil stones. These stones come in a range of grits from very coarse to very fine. They should be soaked only in distilled water to prevent the build–up of salts.



A holder made from common pipes can provide a full range of three–dimensional positioning.

For establishing the bevel on your gouges I would recommend a 100–grit friable aluminum oxide wheel mounted on a motor so that it rotates away from you. This direction is the opposite of the method for sharpening chisels. Since it is friable, the wheel will run cooler and always present sharper crystals for abrading the steel.

Mallets

For carving in harder woods you will probably want to use a woodcarver's mallet. These are round in cross section and come in several weights since it's usually the weight of the mallet, rather than the force applied by the carver, that is used to drive the gouge through the wood. I would recommend the soft head type made with urethane. This style is more resilient than the hardwood mallets and less tiring for the carver.

Abraders

Abraders are used to smooth the wood. There are many times when sandpaper will not do the job, and in these cases, riffler rasps and files are very useful. Rifflers come in many curved shapes to fit a variety of contours. Rasps are the coarsest with many tiny teeth for cutting. The files can be used in small areas instead of the finest sandpaper. Riffler files can be obtained from jewelers' supply stores. I've found the industrial diamond riffle files made by Titan Tool Supply Co. (66 Comet Ave., Buffalo, NY 14216) to be especially effective in wood carving. A set with various shapes and coarseness is shown in the photograph above left.

Holders

Wood carving tools usually require both hands for control of the tool, thus some device must be used to hold the wood. For relief carving, simple C–clamps are usually sufficient. However, for in–the–round carving, a multiple–position holder or vise of some type is desirable. There are a great variety of these made for sculptors and carvers and they differ according to the size of wood they can accommodate.

You can also make a holder from common pipe obtained from your hardware store. An example is shown in the photograph above and provides the full range of three–dimensional positioning.

Characteristics of Carving Woods

There are many woods that are appropriate for carving. The following short list is oriented toward their carving characteristics to help you decide which woods to choose for your carvings.

Basswood is one of the best all–around soft woods for carving. It has a fine texture with no pronounced grain patterns and does not split or check easily. The wood is light in weight and easily carved. The color is creamy white so many carvers choose to stain or paint the finished carving. Since the wood contains so little resin, it is easy to paint; however, its high degree of absorption makes it difficult to stain.

Cherrywood is a light reddish–brown, and is one of the favorite fruit woods for carving. It is close, straight–grained, and fairly hard; thus it can be used for carvings with fine detail. In this respect cherry is somewhat better than walnut for carving details. It takes an excellent finish and has a beautiful grain.

Jelutong is a whitish wood from South East Asia. It's softer than basswood and carves very easily, even across grain. However, it does have internal sap channels which must be filled if they occur in your particular piece.

Mahogany is an easy wood to carve; however, it can be unpredictable since the grain can change direction rather abruptly. Honduras mahogany is readily available and easy to carve. The grain is coarse and has open pores which should be filled whenever you want a smooth surface. The wood takes a finish well and polishes beautifully. This is a particularly good wood for carving. Philippine mahogany is not a true mahogany. It's generally softer, has larger pores, and is coarser than the true mahoganies. This wood is very stringy and generally of poor quality for carving.

Maple is a light–weight hard wood which takes details well, and thus is good for reliefs and lettering projects. Use the sugar maple species since soft maple is not a very good carving wood.

Myrtle, also known as California laurel, grows along the Pacific Coast in California and Oregon. It's a moderately hard and strong wood with a close grain and a slight tendency to split. Soil minerals contribute to a wide variation in color. This is an excellent carving wood and it is possible to attain delicate detail.

Oak is strong and durable, and has attractive color and grain. It is most suitable for works featuring a bold treatment and is not often used for small carvings.

Padauk, also known as vermillion, is a brilliant orange–red when first cut, and turns a deep vermillion upon exposure to light. The wood has a moderately coarse texture with large open pores which can make it difficult to carve fine details.

Most of the **pines** are good for carving. Sugar pine is straight–grained and relatively coarse textured, with nearly uniform growth rings. Its color is light brown. Eastern white pine is creamy white to light brown, of medium texture and fairly even grain. Western white pine has a somewhat coarser texture. Avoid yellow pine which is hard, knotty, and resinous with a tendency to split.

In **poplar** the sapwood is almost white to yellowish with the heartwood providing regions of pale olive. The wood is moderately soft but has a resiliency which fights your gouge, thus it's not the best for small carvings. The wood's fibrous nature makes it more time–consuming to carve than basswood; however, this same fibrousness means it can be cut extremely thin and yet retain it strength.

There are two types of **redwood** that can be used for carving. The coastal redwood is mostly used for large carvings not requiring fine detail. You will see many chain saw carvings in this wood. It has a very coarse grain that splits easily. The presence of hard and soft growth rings makes it easy to carve along the grain but quite difficult across the grain. The wood can be strengthened for carving by impregnation with beeswax, which gives it a salmon color. The Sierra redwood is very soft and requires very sharp tools.

Eastern **black walnut** is one of the most beautiful of our native woods. The heartwood is a light to dark chocolate brown. It's one of the favorites for carvers since it holds details well and finishes beautifully. It has a moderate grain with coarse diffuse pores. California walnut, known as **claro walnut**, is also used by many carvers, but does not carve as well as the Eastern black walnut.

Water tupelo is a very fine–grained white wood which grows in the flood plains along the Atlantic and Gulf coasts and up into the Mississippi Valley. It's a white, straight–grained wood which will take detail cuts without splintering. It's whiter and lighter than basswood and is used by many duck carvers. However, its sanding dust is toxic to many people.

Basic Tool and Wood List for Beginners

To help you get started, I will list a minimum set of tools to buy. These will accomplish many wood carving projects. You can add to this list as you find a need for more tools.

1. Cutters

The minimum set of gouges for the beginner which I have found to be the most useful consists of the following five:

8 mm	skew
5 mm	#3 shallow gouge
16 mm	#3 shallow gouge
10 mm	#9 deep gouge
8 mm	V–tool

These tools should be of the standard length which are easier to use than the short ones. Whenever you want to expand on this set, then I would recommend first adding more sizes of the #3 gouges since these are the most useful in carving the final details. Smaller skews which are used in detailing would be the next ones to add after that.

2. Sharpeners

If you buy only one stone, I would recommend the 1200–grit Japanese waterstone. This will sharpen your gouges well enough for most carving. As you add to your set, obtain the finer grits. For establishing the bevel on new tools you will need a 100–grit aluminum oxide grinding wheel.

3. Abraders

A beginning carver should not need anything but sandpaper at first. Then, whenever you find the need, get a few jeweler's riffler files.

4. Holders

For relief carving, a pair of 6" Jorgensen high–speed bar clamps works well. For in–the–round carvings, I would recommend the Model 301 standard PanaVise™ available from many mail order tool suppliers. This is a versatile tool which can be fitted with other heads in addition to the vise.

5. Wood

Probably the best woods to start with are basswood and Honduras mahogany. They both carve easily and are usually available at specialty lumber stores in sizes suitable for carving.

With the above list of tools and materials you are now ready to begin carving, and in future articles I will describe some projects you can work on. PW

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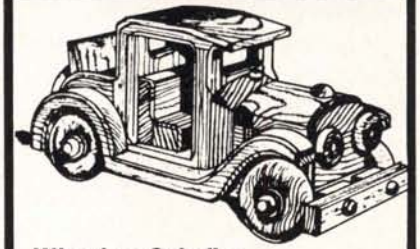

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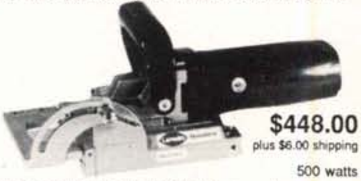

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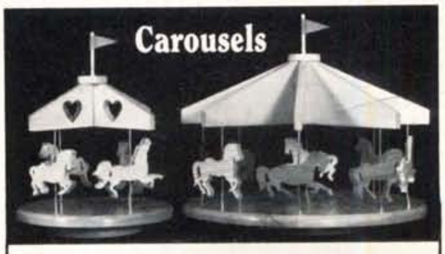

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Calendar

Events of Interest to Woodworkers

August 4–28, Seattle, WA

"Exotic Edge," is a collaborative show by Hank Holzer, a furniture maker, and Michael Peterson, a woodturner. This will be the first time they explore these techniques in Asian, African, and South American exotic woods. For more information contact Cheryl J. Peterson, Northwest Gallery of Fine Woodworking, 202 First Avenue South, Seattle, WA 98104 or call (206) 625–0542.

August 14–17, Chicago, IL

Over 1700 exhibitors will participate in the 45th National Hardware Show at the McCormick Place Complex. For more information contact Candace Leeds, Joseph Kist, The Barth Group (212) 689–6602.

August 27–28, Northridge, CA

California Carvers Guild will stage its second annual "Wood Carvers Expo" benefit show at Devonshire Downs in Northridge. The show will feature carving demonstrations, whittling contests and a juried show for awards in more than 30 categories. For more information contact CCG Headquarters in San Simeon at (805) 927–4718.

September 6–20, Switzerland

Switzerland Woodworking Tour. Hosted by Gottlieb Brandli. Departs from Boston, New York, or Chicago; $2,600 per person. For more information contact Doug Werbeck, The Image Group, 1575 Logan St., Clearwater, FL 34615 or call 1–800–521–7623.

September 10–11, Wrightstown, PA

Pennsylvania Crafts Festival at the Grange Fairgrounds, Bucks County, Wrightstown. 175 professional artisans, demonstrations and good food. For more information contact United Craft Enterprises, Box 326, Masonville, NY 13804 or call (607) 265–3230.

September 15–17, Philadelphia, PA

The American Association of Woodturners (AAW) will be hosting its 1988 Second Annual Symposium at the Holiday Inn, Center City. A trade show will feature manufacturers and sellers of lathes, turning equipment, exotic woods and supplies. For more information contact The American Associaiton of Woodturners, P.O. Box 982, San Marcos, TX 78667 or call (512) 396–8686.

September 15, Harrisburg, PA

America's Masters, a series of arts and crafts shows designed exclusively for the master artist and craftsman, is now accepting applications for the first show at the PA State Farm Show Complex in Harrisburg, November 25 – 27. Dead line for applications is September 15. For more information write: I.M.K. Production, Kay Kishbaughm, P.O. Box 3279, Shiremanstown, PA 17011,or call (717) 697–8288.

September 17–November 13, Philadelphia, PA

The International Turned Objects Show (ITOS) will be held at the Port of History Museum. This is the first juried and invitational exhibit of global magnitude featuring lathe–turned objects. A preview and reception for the artists is open to the public on September 16, from 5:30–8:00 p.m. For more show information or a catalog, contact the Wood Turning Center, P.O. Box 25706, Philadelphia, PA 19144 or call (215) 844–0151.

September 23–25, White Plains, NY

The 3rd Annual New York Show at the Westchester County Center. For more information contact Doug Werbeck, The Image Group, 1575 Logan St., Clearwater, FL 34615 or call 1–800–521–7623.

September 30–October 2, Charlotte, NC

The 4th Annual Carolina Show at the Merchandise Mart. For more information contact Doug Werbeck, The Image Group, 1575 Logan St., Clearwater, FL 34615 or call 1–800–521–7623.

October 1–2, Wilmington, DE

Delaware Crafts Fair at the Delaware Park Racetrack. 150 professional artisans, demonstrations and good food. For more information contact United Craft Enterprises, Box 326, Masonville, NY 13804 or call (607) 265-3230.

October 6–November 6, Seattle, WA

Second Annual NW Furniture Exhibition, will feature new furniture creations by 44 designer/craftsmen from Idaho, Montana, Oregon and Washington. This will be a show of the most current furniture art yet to be seen in the NW. For more information contact Cheryl J. Peterson, Northwest Gallery of Fine Woodworking, 202 First Avenue South, Seattle, WA 98104 or call (206) 625–0542.

October 7–9, Rockford, IL

The 5th Annual Chicago Show at The Metro Center. For more information contact Doug Werbeck, The Image Group, 1575 Logan St., Clearwater, FL 34615 or call 1-800-521-7623.

October 8–9, Flemington, NJ

Flemington Crafts Festival at the Flemington Fairgrounds. 175 professional artisans, demonstrations, entertainment and good food. For more information contact United Craft Enterprises, Box 326, Masonville, NY 13804 or call (607) 265–3230.

October 12–26, Italy, China

A series of woodworking study–travel tours, organized by Eva Frank and sponsored by George Frank, the renowned wood finisher and author, will begin with a trip to Italy. A second tour is scheduled for major cities in China June 3–19, 1989. For more information on rates, inclusions, itinerary and accommodations contact Eva Frank at (813) 923-3377 or write Ms. Frank at 3504 Beneva Rd., Sarasota, FL 34232.

October 15, Washington, D.C.

Artists making original, one–of–a–kind or limited–edition pieces are invited to apply for the 1989 Washington Craft Show. Applications must be postmarked by October 15. For more information write: Smithsonian Associates Women's Committee, Arts and Industries Building, #2475, Smithsonian Institution, Washington, D.C. 20560 or call (202) 357–4000.

December 2–4, 9–11, and 16–18, Manhattan, NY

The 17th Annual WBAI Holiday Crafts Fair, the oldest and largest winter crafts marketplace in America, will be taking place in Columbia University's Ferris Booth Hall. For more information contact WBAI at (212) 279–0707 or (212) 695–4465.

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Greater Boston	Sept. 30-Oct.2	Royal Plaza Trade Center, Marlborough
No. California	Oct. 7-8-9	Brooks Hall, San Francisco
Pittsburgh Tri-State	Oct. 14-15-16	Expo Mart, Monroeville
So. California	Oct. 28-29-30	Los Angeles County Fairgrounds
Metro-Detroit	Nov. 4-5-6	Cobo Hall, Detroit
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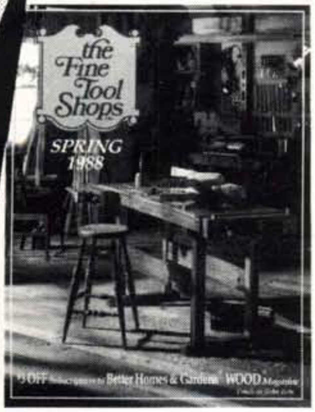

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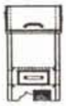

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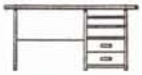

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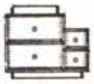

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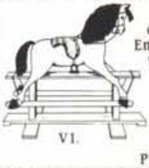

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Out of the Woodwork

by Bob Laney

Elusive Tools

The most important factor in building projects is not accuracy or skill in tool handling. It's being able to find the tools you've laid down.

The real time–devourer in most home-handyperson projects is not how long it takes to measure, mark and cut x-number of boards or drill y-number of holes. The biggest blocks of time are eaten up by looking for the square you've set down, the pencil that's leaped out of your pocket, or the 5/8" bit you unchucked only minutes ago.

Very small tools are expected to get lost easily, and are therefore more likely to be consciously kept track of. A hammer is not a very small tool, but hammers are fiendishly hard to find once released. They have an instinct for concealing themselves under pieces of wood, behind paint cans, and under other tools. Hammer loops on jeans, overalls, and coveralls have been carefully designed to twist and drop hammers loose so that you don't use the loops, no matter how neat they looked.

Measuring tapes will fit in pockets or clip onto belts, but like escape-crazed prisoners, they go underground the moment an unwary hand lays them on a bench. Never put a measuring tape down unless you are prepared to spend precious profane minutes in search of it.

Pencils are a breed unto themselves. Any breast pocket capable of retaining a pencil when you bend over will make the pencil as hard to remove and replace as a twelve–pound object in an eight–pound bag. My usual procedure is to carry a box of sharpened pencils, replacing each lost pencil until it's empty. I've never established if this saves time overall, but at least it reduces the frequency of pencil hunts, and rounding up all the misplaced pencils is a good excuse for a break.

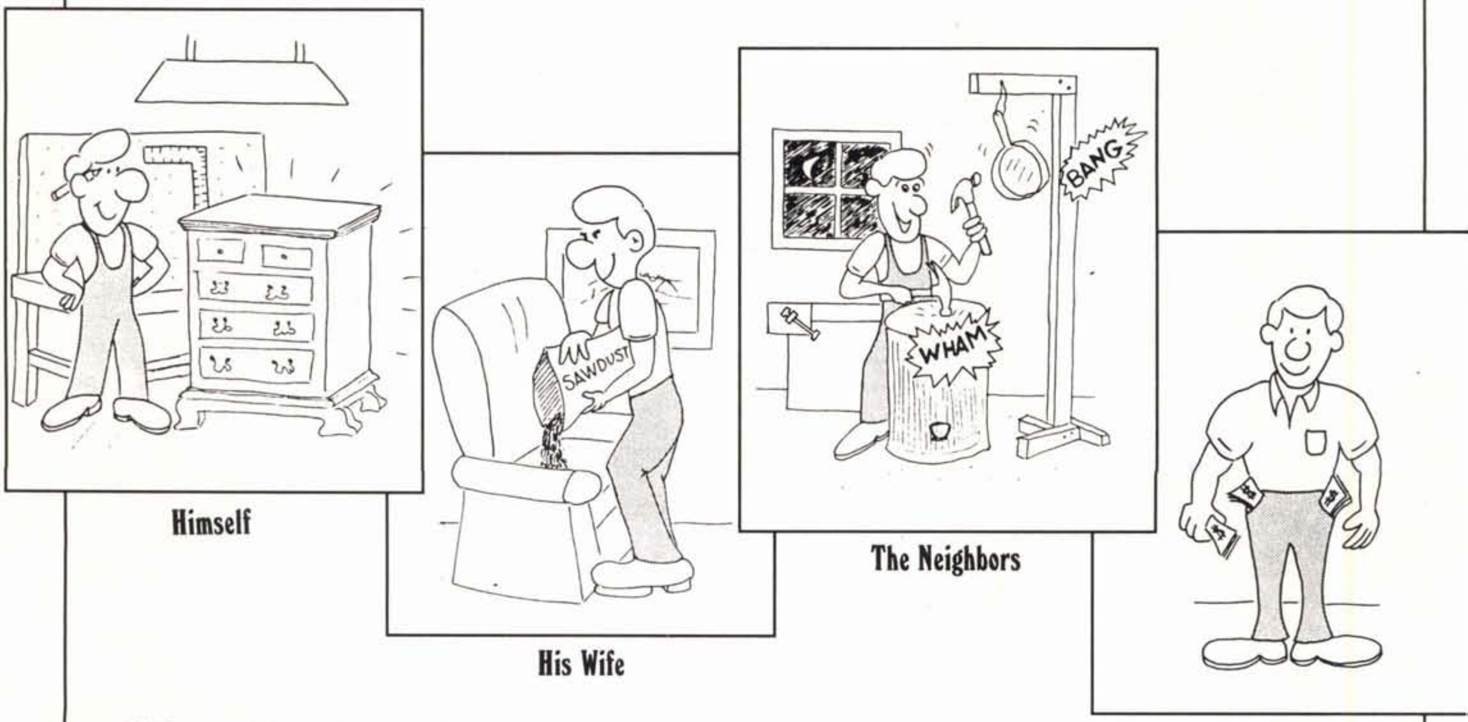
Professionals seem to have a knack for keeping track of tools during a job. I suspect this is what separates them from amateurs, never mind the skill. But when a pro loses a tool, it's professionally lost.

I know of a pro who lost a radial arm saw on a job site. Ed had set the saw up in the unfinished living room area of a condo unit. The kitchen was near enough completed that the applicances had been brought in and uncrated. The big carton from the refrigerator had found its way out into the living room area where some waggish construction laborer set the carton down over the radial arm saw. Ed finally spotted the power cord snaking its way out from under the upended carton and regained his saw, if not his sense of humor.

I don't have an answer to the misplaced–tool dilemma, except for the one Daniel Boone is supposed to have given when asked if he'd ever been lost in the wilderness: “Can't say that I have, but I was once a might bewildered for five days.” PW

***Bob Laney** of Hendersonville, NC works in a custom picture–framing shop and makes traditional woodworking tools as a hobby.*

The Woodworker As Seen By...



Himself

His Wife

The Neighbors

The Guys at the Lumber Yard

Written and drawn by Curt Mobley

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LU78M008	8	64 TCG	G	G	E	E	NR	112.57	**93.98**
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LU78M012	12	96 TCG						169.29	**135.68**
LU78M014	14	108 TCG						199.80	**141.98**
LU84M008	8	40 Comb	E	G	G	NR	G	85.96	**59.58**
LU84M009	9	40 Comb						85.31	**59.58**
LU84M011	10	50 Comb						89.54	**52.18**
LU84M012	12	60 Comb						135.31	**97.98**
LU84M014	14	70 Comb						161.34	**116.48**
LU85M008	8	64 ATB	NR	E	G	G	NR	112.08	**73.98**
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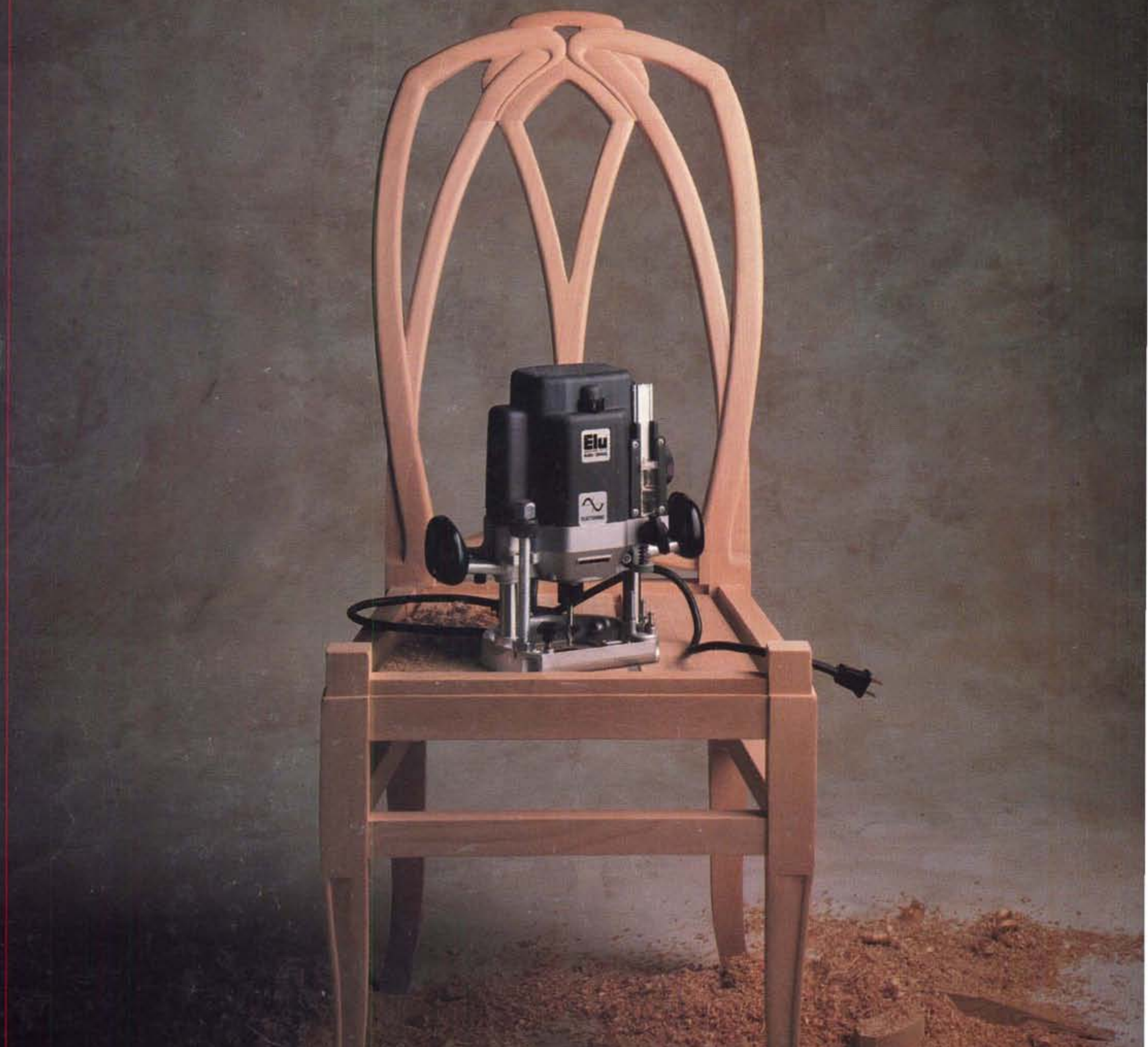

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